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SVME/DMV-179
Hardware User's Manual

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Revision History

Rev	By	Date	Description
-	BJ	December 1999	First release. This document is associated with SVME/DMV-179 products manufactured using PWB # 310939-003 or later.
A	BJ	July 2000	Removed the BI-mode section from Chapter 1 as BI-mode is no longer supported. Added "Cache Coherency" on page 1-29. Added note to "EIA-422/485 Interface" on page 1-36. Corrected Bridge Timer information in Table 1.6 on page 1-45. Corrected Watchdog information on page 1-46. Corrected diagram of J9 connector (Figure 2.3 on page 2-27). Corrected Table 2.1 on page 2-3. Corrected Table 2.15 on page 2-18 and Table 2.18 on page 2-23. Improved page 3-4. Corrected Figure 3.1 on page 3-31. Corrected "VMEbus Base Addresses" on page 3-34.
B	BJ	June 2001	Modified "Serial EEPROM" on page 1-31. Modified "Reset" on page 1-33. Corrected "SCSI I/O Pinout" on page 1-39. Modified "Watchdog Timer" on page 1-46. Modified "Reset Supervisor" on page 1-48. Added "Using the SVME/DMV-179 Pinout Configurator" on page 2-44. Changed references to "Parallel I/O" to "Discrete Digital I/O" in Chapter 3.
C	BJ	February 2002	Updated to reflect PWB 310939-004. This PWB has a jumper (E48 - E49) for selection of the Permanent Alternate Boot Site. Added mention of E48 - E49 to "Permanent Alternate Boot Site" on page 1-30. Added mention of E48 - E49 to "Non-Volatile Memory Map" on page 1-31. Updated "JTAG" on page 1-34. Updated "Real Time Clock (RTC)" on page 1-41. Improved "RTC Power Supply" on page 1-42. Corrected Real Time Clock entry in Table 1.6 on page 1-45. Improved "Discrete Digital I/O" on page 1-49. Added notes about EIA signal naming conventions on page 2-6 and on page 2-19. Corrected Table 2.8 on page 2-11. P1-A16 is DTACK* in Table 2.9 on page 2-12 and Table 2.11 on page 2-14. Updated Table 3.8 on page 3-12. Corrected Table 3.10 on page 3-14. Corrected Figure 3.1 on page 3-31. Added note below Figure 3.1 on page 3-31. Corrected "GT-64130" on page 3-32. Corrected A24 addresses in Table 3.30 on page 3-34.
D	BJ	January 2003	Updated "64-bit Flash Protection" on page 1-30. Updated "Serial EEPROM" on page 1-31. Updated "EIA-422/485 Interface" on page 1-36. Updated Table 1.6 on page 1-45. Updated "Discrete Digital I/O" on page 1-49. Throughout Chapter 2, SCSI signals now have a "*" to indicate they are active low. Corrected Table 3.11 on page 3-15.

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Preface

Purpose

The purpose of this manual is to provide you with an architectural and functional description of the SVME/DMV-179 Single Board Computer. In addition, the manual provides information such as connector pin assignments, I/O interfaces, and programming interfaces.

Audience

This manual provides technical reference information for systems integrators, engineers, and application designers.

Scope

This document contains the following modules:

Chapter 1 - Functional Description. Provides architectural and functional descriptions of the SVME/DMV-179 card. Also discusses the PowerPC and Universe PCI - VMEbus components.

Chapter 2 - Connector Pin Assignments. Lists and describes pin assignments for each of the SVME/DMV-179's connectors.

Chapter 3 - Programming Interface. Provides information on the VMEbus address mapping, as well as register format and contents.

Appendix A - Manufacturer's Documents and Related Information. Provides titles of component manufacturer's data sheets and relevant standards.

Reference Documents

Refer to the *SVME/DMV-179 Getting Started Manual* (document number 809605) for procedures for installing your card, connecting cables, and verifying normal operation.

See the *V8 Foundation Firmware User's Manual* (document number 808006) for more information about the firmware loaded on your card.

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Chapter 1
Functional Description

In this chapter...

This chapter provides the following information about the SVME/DMV-179:

- ❏ architectural overview of the card;
- ❏ functional description of the devices;
- ❏ PowerPC 7400 and 750 architecture and features; and
- ❏ Universe IID features.

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SVME/DMV-179 Architecture

The SVME/DMV-179 is a Single Board Computer (SBC) that supports either the Motorola PowerPC 7400 or 750 processor. These processors are low-power implementations of the PowerPC microprocessor family of RISC microprocessors.

The PowerPC chip implements the 32-bit portion of the PowerPC Architecture specification that provides 32-bit effective addressing, integer data types of 8, 16, and 32 bits and floating-point data types of 32 and 64 bits. The PowerPC has a selectable 32-bit or 64-bit data bus and a 32-bit address bus.

The PowerPC resides on its own bus called the PowerPC bus.

A logical bridge links the PowerPC Bus to the PCI Bus. Connected to the PCI Bus are:

- Ethernet, Universe IID VMEbus, and Ultra SCSI interfaces
- two PMC interfaces

A second bridge links the PowerPC memory bus to the peripheral bus. Connected to the peripheral bus are:

- DUART device, providing 2 EIA-232 channels
- SCC Serial I/O device, providing 2 EIA-422/485 channels
- Real Time Clock
- NOVRAM

Cross Reference

In this manual, PowerPC definitions are used for byte and word length. These definitions are found on page 1-9.

Figure 1.1 illustrates the SVME/DMV-179 architecture.

The processor level 2 (L2) cache connects directly to the processor via the “backside” 64-bit L2 cache bus. A highly integrated bridge chip interfaces the PowerPC processor bus to the 64-bit PCI bus and acts as the memory controller. Via the bridge chip, the processor has access to the 64-bit wide Flash, the 64-bit synchronous DRAM, and the 64-bit PCI bus. Up to 256 Mbytes of Synchronous DRAM and 48 Mbytes of Flash are provided directly on the main board with no need for a mezzanine card. As well, the bridge chip provides extensive buffering via FIFOs. This allows the bridge chip to provide the processor data from SDRAM while simultaneously performing a burst read on the PCI bus.

The 64-bit, 33 MHz PCI bus provides a high-speed data path with which to access the VMEbus and the two expansion PMC sites. With a peak transfer rate of 264 Mbytes/sec, the PCI bus has the necessary capacity to support high bandwidth PMC modules such as Fibre Channel interfaces, display controllers,

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and custom high-speed interfaces. The 10/100 Mbit/sec Ethernet interface and the Ultra SCSI are connected through a 32-bit bus, with a peak transfer rate of 132 Mbytes/sec.

Ever more complex application requirements and higher levels of software abstraction lead to larger and larger software loads. The SVME/DMV-179 meets this challenge with state-of-the-art technology that provides up to 48 Mbytes of non-volatile program and data storage.

The use of high-efficiency switching regulators for the 3.3 V and CPU core requirements is integral to allowing all the functionality of the SVME/DMV-179 to be powered by only 17 Watts (typical) of +5 V power.

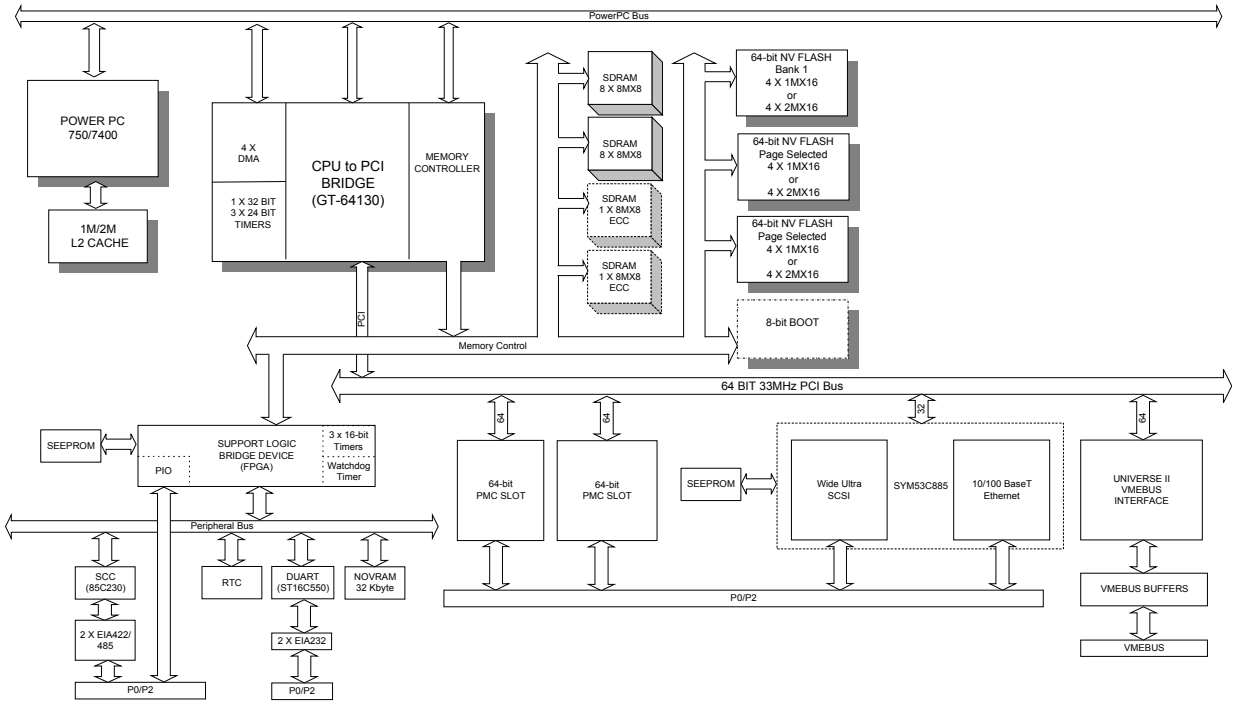

Figure 1.1 SVME/DMV-179 Functional Block Diagram

Cross Reference

The Technical Documentation CD-ROM provides easy access to component vendors' internet sites. You can find data sheets for components that are on the SVME/DMV-179.

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SVME/DMV-179 Features List

The SVME/DMV-179 is a Single Board Computer (SBC) which incorporates the following major features:

- PowerPC™ 7400 CPU enhanced with AltiVec™ technology OR PowerPC™ 750 CPU
- 64, 128, or 256 Mbytes Synchronous DRAM with EDAC without mezzanines
- 1 Mbyte or 2 Mbytes of L2 cache
- Peak processor-memory bandwidth of 528 Mbytes/sec; peak L2 cache bandwidth of 1.064 Gbytes/sec
- Up to 48 Mbytes of 64-bit wide direct memory-mapped Flash™ memory
- 32 Kbytes of AutoStore nvSRAM
- Two IEEE P1386/1386.1 64-bit, 33 MHz PMC sites for high-performance I/O expansion
- 64-bit PCI local bus architecture, 264 Mbytes/sec peak data transfer rate
- 10Base-T/100Base-TX (twisted pair) Ethernet™ port
- 8 or 16-bit Ultra SCSI interface
- Two EIA-232 serial ports
- Two EIA-422/485 serial channels, one with DMA support
- 12 bits of discrete TTL I/O, each with interrupt capability
- One 32-bit, three 24-bit general purpose timers
- Three 16-bit system timers
- Watchdog timer with software programmable time-out period
- Real Time Clock with automatic +5 V/+5 V STDBY switchover
- Two general-purpose DMA controllers
- Tundra Universe IID VME64 master/slave interface
- Comprehensive Foundation Firmware with:
  - debug monitor and non-volatile memory programmer
  - suite of card support service routines
  - BIT firmware
  - 95% BIT fault coverage
  - VxWorks® and LynxOS support
- air-cooled and conduction cooled versions
- optional levels of ruggedization available

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Central Processing Unit (CPU)

The SVME/DMV-179 supports a range of Motorola processors at different operating frequencies. Supported devices are the PowerPC 7400 and PowerPC 750 microprocessor families.

For further details on any processor, refer to the relevant Motorola data books.

Cross Reference

To determine which processor is fitted on your particular SVME/DMV-179 card, please refer to the *Product Release Note* that accompanied your card.

PowerPC 7400 and 750 Architecture

The PowerPC 7400 and PowerPC 750 CPUs are fourth generation members of Motorola's PowerPC family of high-performance, 32/64-bit RISC-based microprocessors. Developed for both desktop and embedded applications, these CPUs provide industry-leading performance per Watt.

The PowerPC 7400 and PowerPC 750 integrate all of the following onto a low-power monolithic die:

- Superscalar processor (two integer ALUs and enhanced floating point unit)
- 32 Kbytes instruction and data caches
- on-chip cache tags for up to 1 Mbyte of L2 cache
- 128-bit wide internal data paths, with 64-bit system bus and L2 cache bus
- 32-bit addresses
- 64-bit data
- integer data types of 8, 16, and 32 bits
- floating-point data types of 32 and 64 bits
- three power-saving modes which can be enabled through software

In addition, the PowerPC 7400 offers AltiVec technology and supports 2 Mbytes of L2 cache.

Figure 1.3 shows the functional block diagram for the PowerPC 750.

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PowerPC 7400 Features

Figure 1.2 is the PowerPC 7400 block diagram. The following section lists the features of the PowerPC 7400.

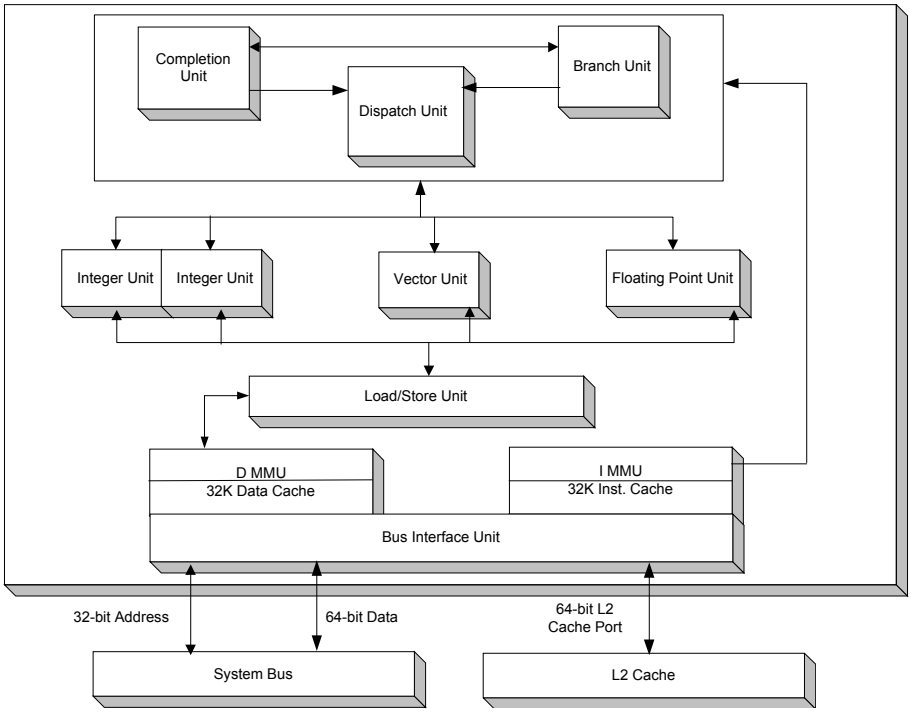

Figure 1.2 PowerPC 7400 Functional Block Diagram

High-Performance Superscalar Microprocessor

The PowerPC 7400 is a high-performance superscalar microprocessor which provides:

- full 128-bit implementation of Motorola's Altivec technology instruction set
- up to four instructions can be fetched from the instruction cache per clock cycle
- up to three instructions can be dispatched per clock cycle
- up to six instructions can execute per clock cycle (including two integer instructions)
- single-cycle execution for most instructions

The PowerPC 7400 has seven independent execution units, comprising:

- two integer units
- a floating-point unit
- a vector unit
- a branch processing unit
- a load/store unit
- a system register unit

The PowerPC 7400 also includes separate 32 Kbyte physically addressed instruction and data caches. Both caches are eight-way set associative.

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PowerPC 750 Features

Figure 1.3 is the PowerPC 750 block diagram. The following section lists the features of the PowerPC 750.

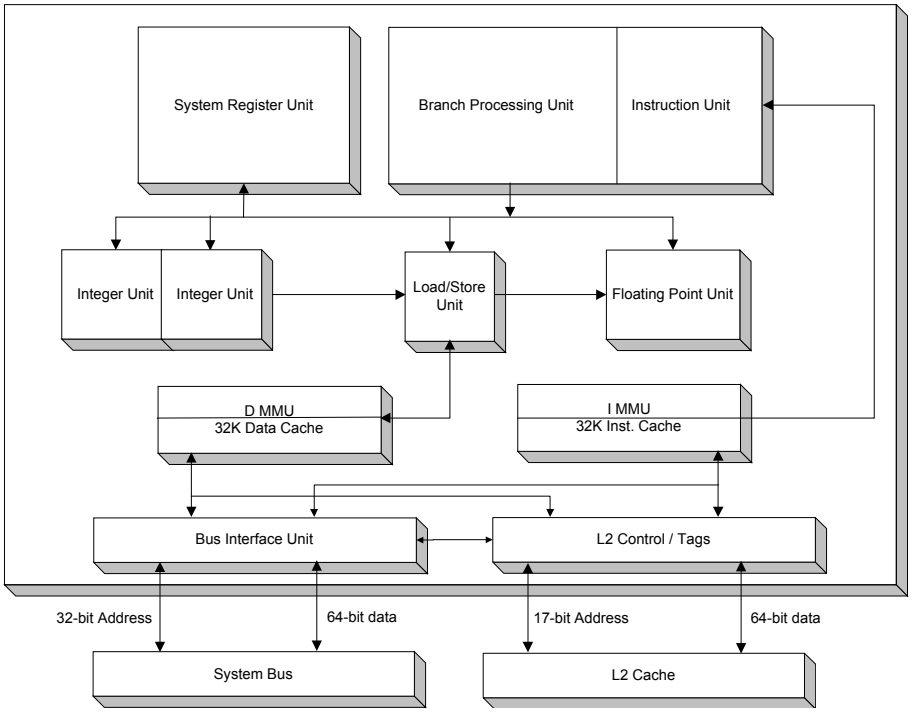

Figure 1.3 PowerPC 750 Functional Block Diagram

High-Performance Superscalar Microprocessor

The PowerPC 750 is a high-performance superscalar microprocessor which provides:

- up to four instructions can be fetched from the instruction cache per clock cycle
- up to two instructions can be dispatched per clock cycle
- up to six instructions can execute per clock cycle (including two integer instructions)
- single-cycle execution for most instructions

The PowerPC 750 has six independent execution units, comprising:

- two integer units
- a floating-point unit
- a branch processing unit
- a load/store unit
- a system register unit

The PowerPC 750 also includes separate 32 Kbyte physically addressed instruction and data caches. Both caches are eight-way set associative.

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Facilities for Enhanced System Performance

The PowerPC 7400 and 750 enhance system performance by providing:

- a 32- or 64-bit split transaction external data bus with burst transfers
- support for one level address pipelining and out-of-order bus transactions
- bus extensions for I/O controller interface operations

JTAG

The PowerPC 7400 and 750 have in-system testability and debugging features through JTAG boundary-scan capability. The JTAG COP interface is available at the front panel J9 connector (SVME version only).

CPU Bus Error (BERR) Logic

MCP (machine check) is generated if SERR# (PCI address error) occurs.

CPU Retry Logic

When the CPU attempts a cycle to the VMEbus that results in a deadlock, the PowerPC ARTRY/ and AACK/ lines are asserted along with the negation of BG/. This will cause the CPU to relinquish control of the PowerPC Bus and execute a cycle retry for the operation.

Data Sizing

An important feature to note concerns the names used for data-bit sizes. This document uses the PowerPC naming convention, as shown in Table 1.1. Table 1.1 also compares the PowerPC conventions with the VMEbus conventions.

Table 1.1: PowerPC and VMEbus Conventions

PowerPC Data Element	Size (bits)	VMEbus Data Element (68xxx)
byte	8 bits	byte
half word	16 bits	word
word	32 bits	long word
double word	64 bits	double long word (or quadword)

Data Ordering

The PowerPC bus is connected to the PCI Bus, which in turn is connected to various I/O devices. Table 1.2 shows the data ordering of the PowerPC and PCI Buses.

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Table 1.2: Data Ordering in the PowerPC and PCI Buses

	PowerPC Bus		PCI Bus	
	Address Bus	**Data Bus**	**Address Bus**	**Data Bus**
MSB	A0	DH0	A31	D31
LSB	A31	DL31	A0	D0

The PowerPC data bus is usually referred to as two 32-bit data buses, high (DH(0:31)) and low (DL(0:31)). When referred to as a 64-bit bus, then the bit significance is as shown in Table 1.2.

Table 1.3 shows the byte lanes used for data bus transfers.

Table 1.3: Data Bus Requirements For Read And Write Cycles

		PowerPC Data Bus							
Transfer Size	Offset	DH(0:7)	DH(8:15)	DH(16:23)	DH(24:31)	DL(0:7)	DL(8:15	DL(16:23)	DL(24:31)
Byte	0	BYTEn							
	1		BYTEn						
	2			BYTEn					
	3				BYTEn				
	4					BYTEn			
	5						BYTEn		
	6							BYTEn	
	7								BYTEn
Half Word	0	BYTEn	BYTEn						
	2			BYTEn	BYTEn				
	4					BYTEn	BYTEn		
	6							BYTEn	BYTEn
Word	0	BYTEn	BYTEn	BYTEn	BYTEn				
	4					BYTEn	BYTEn	BYTEn	BYTEn

Cross Reference

For additional information about the PowerPC microprocessor, refer to the *PowerPC 750 RISC Microprocessor User's Manual* or the *PowerPC 7400 RISC Microprocessor User's Manual (*depending the processor fitted on your card).

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Buses

PowerPC Bus

The PowerPC is a 64-bit wide data bus device that provides access to the main DRAM and Flash memory, as well as the Level 2 cache. The PowerPC Bus frequency is fixed at 66 MHz and is configured for 64-bit operation. The bridge to the PCI Bus is implemented with a GT-64130 System Controller for PowerPC Processors.

PowerPC Bus Arbitration

There are two possible bus masters for the PowerPC Bus: the PowerPC 7400/750 processor and the GT-64130. All accesses from the VMEbus or the PCI bus will be presented through the GT-64130. The GT-64130 provides arbitration for control of the PowerPC bus.

PCI Bus

The PCI bus, as implemented on the SVME/DMV-179, is 64-bits wide and operates at a frequency of 33 MHz. It is compliant with revision 2.1 of the PCI bus specification. Peripheral interface controllers that reside on the PCI bus include SCSI, Ethernet, and the VMEbus interface. Also residing on the PCI bus are two expansion PCI Mezzanine Card (PMC) sites compatible with P1386.1/Draft 2.0 04-April-95, Draft Standard Physical and Environmental layers for PCI Mezzanine Card. An FPGA provides the bridge to the peripheral bus.

PCI Bus Arbitration

The potential PCI bus masters include:

- GT-64130 (for accesses from the PowerPC processor to the PCI bus)
- Universe IID (for accesses from the VMEbus)
- SCSI controller (for transfers from the SCSI bus)
- Ethernet controller (for transfers from the Ethernet LAN)
- possible bus masters installed in either or both of the PMC slots

The FPGA provides arbitration for control of the PCI bus, implementing a round-robin arbiter, ensuring that no master is locked-out from the bus.

Peripheral Bus

The peripheral bus supports a range of slower speed slave functions, including the Real Time Clock, NOVRAM, general purpose serial EEPROM and serial ports. The programmable 16-bit counter/timers and watchdog function are also accessed via the peripheral bus.

Peripheral Bus Arbitration

The peripheral bus is a slave bus and has no bus masters as such.

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SCSI Bus

A Symbios SYM53C885 device controls the SCSI bus. It supports SCSI-1, SCSI-2 (Fast SCSI), and SCSI-3 (Wide Ultra SCSI) standards using a single ended interface. The SCSI interface can be operated in synchronous mode at up to 40 Megatransfers per second corresponding to 40 Mbytes/s in a 16-bit configuration.

Cross Reference

The SYM53C885 also controls Ethernet access. For further information about the Symbios SYM53C885, refer to page 1-38 of this manual or to the manufacturer's data book. You may use the links to the component vendors' websites provided on the Technical Documentation CD-ROM for the SVME/DMV-179.

Indivisible Cycles on the PowerPC Bus

Indivisible cycles are required during semaphore read-modify-write cycles when a bus master not only requires access to a device for several cycles, but also requires that no other resource can access the device in between.

The PowerPC can execute indivisible instruction sequences.

However, an indivisible sequence is only successful if all parts of the chain can maintain the indivisibility. Refer to the following sections to determine the level of support for indivisible accesses.

GTC-64130 Lock

As a master, the GT-64130 does not generate locked operations. This means that the processor cannot generate a locked access to the VMEbus.

As a target, the GT-64130 responds to locked operations by guaranteeing complete access exclusion to system memory from the point of view of the PCI bus. From the point of view of the processor, only the cache line fill (32 bytes) transactions are locked.

VMEbus Locks

The Universe IID supports the VMEbus lock commands as described in the VME64 specification. Any resource locked on the VMEbus, cannot be accessed by any other resource during the bus tenure of the VMEbus master.

If the Universe IID receives a VMEbus lock command, it asserts LOCK# to the addressed resource on the PCI Bus. The Universe IID holds the PCI bus lock until the VMEbus lock command is terminated (that is, when BBSY* is negated).

PCI Exclusive Accesses

A PCI master obtains exclusive access to a resource on the VMEbus through the combined use of the PCI LOCK# signal (which locks the PCI Slave Interface against other PCI masters) and the VMEbus ADOH cycle (which locks the VMEbus resource against other VMEbus masters). The ADOH cycle is an Address-Only-with-Handshake access and ensures that the Universe IID VME Master Interface has exclusive access to the VMEbus resource while it has VMEbus tenure.

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Universe IID PCI-VMEbus

The SVME/DMV-179 employs the Universe IID VMEbus interface chip. The Universe IID Chip provides a high-performance 64-bit VMEbus to PCI interface in one device.

Important features of the Universe IID chip include:

- fully compliant, 64-bit, 33 MHz PCI local bus interface
- fully compliant, high performance 64-bit VMEbus interface
- integral FIFOs for write posting to maximize bandwidth utilization
- programmable DMA controller with linked list support
- VMEbus transfer rates of 60-70 Mbytes/sec
- complete suite of VMEbus address and data transfer modes
  - A32/A24/A16 master and slave
  - D64 (MBLT)/D32/D16/D08 master and slave
  - BLT, ADOH, RMW, LOCK
- flexible register set, programmable from both the PCI bus and VMEbus ports
- full VMEbus system controller functionality
- location monitor with FIFO
- Auto-ID

Cross Reference

For further information on VMEbus and local interrupts in the Universe IID chip, refer to Tundra's *Universe II™ User Manual* that is included on your SVME/DMV-179 Technical Documentation CD-ROM.

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VMEbus Interface

The VMEbus interface incorporates all operations associated with the VMEbus. This includes master and slave functions, VMEbus configuration and system controller functions. These operations are covered as follows:

- "VMEbus Requester" below
- "Universe IID as VME Master" on page 1-17
- "Universe IID as VME Slave" on page 1-20
- "VMEbus Configuration" on page 1-25
- "System Controller Functions" on page 1-26

Cross Reference

For detailed information on the VMEbus interface, see Tundra's *Universe II™ User Manual* that is included on your SVME/DMV-179 Technical Documentation CD-ROM.

VMEbus Requester

Internal Arbitration for VMEbus Requests

Three different internal channels within the Universe IID require use of the VMEbus: the Interrupt Channel, the PCI Slave Channel, and the DMA Channel. These three channels do not directly request the VMEbus, instead they compete internally for ownership of the VME Master Interface.

Cross Reference

The Interrupt Channel always has the highest priority for access to the VME Master Interface. The DMA and PCI Slave Channel requests are handled in a round-robin fashion. The channel awarded VMEbus mastership maintains ownership of the VMEbus until it is 'done'. The definition of 'done' for each channel appears in "VMEbus Release" on page 1-15.

The Interrupt Channel requests the VMEbus master when it detects an enabled VMEbus interrupt line asserted and needs to run an interrupt acknowledge cycle to acquire the STATUS/ID.

The PCI Slave Channel requests the VME Master Interface to service the following conditions:

- the TXFIFO contains a complete transaction, or
- if there is a coupled cycle request

The DMA Channel requests the VME Master Interface if:

- the DMAFIFO level reaches the programmed PCI aligned burst size (as set with PABS in the MAST_CTL register), or
- the DMA block is complete

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In the case of the DMA Channel, the user can optionally use the DMA Channel VMEbus-off-timer to further qualify requests from this channel. The VMEbus-off-timer controls how long the DMA remains off the VMEbus before making another request.

The Universe IID provides a software mechanism for VMEbus acquisition through the VMEbus ownership bit. When the VMEbus ownership bit is set, the Universe IID acquires the VMEbus and sets an acknowledgment bit and optionally generates an interrupt to the PCI bus. The Universe IID maintains VMEbus ownership until the ownership bit is cleared. During the VMEbus tenure initiated by setting the ownership bit, only the PCI Slave Channel and Interrupt Channel can access the VME Master Interface.

Request Modes

Request Levels

The Universe IID is software configurable to request on all VMEbus request levels: BR3*, BR2*, BR1*, and BR0*. The default setting is for level 3 VMEbus request. The request level is a global programming option set through the VRL bits in the MAST_CTL register. The programmed request level is used by the VME Master Interface regardless of the channel (Interrupt Channel, DMA Channel, or PCI Slave Channel) currently accessing the VME Master Interface.

Fair and Demand

The Universe IID requester may be programmed for either Fair or Demand mode. The request mode is a global programming option set through the VRM bits in the MAST_CTL register.

In Fair mode, the Universe IID does not request the VMEbus until there are no other VMEbus requests pending at its programmed level. This mode ensures that every requester on a given level has access to the bus.

In Demand mode (the default setting), the requester asserts its bus request regardless of the state of the BRn* line. By requesting the bus frequently, requesters far down the daisy chain may be prevented from ever obtaining bus ownership. This is referred to as “starving” those requesters.

Note

In order to achieve fairness, all bus requesters in a VME system must be set to Fair mode.

VMEbus Release

The Universe IID VMEbus requester can be configured as either RWD (release when done) or ROR (release on request) using the VREL bit in the MAST_CTL register. The default setting is for RWD. ROR means the Universe IID releases BBSY* only if a bus request is pending from another VMEbus master and once the channel that is current owner of the VME Master Interface is done. Ownership of the bus may be assumed by another channel without re-arbitration on the bus if there are no pending requests on any level

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on the VMEbus.When set for RWD, the VME Master Interface releases BBSY* when the channel accessing the VME Master Interface is done (see below).

Note

The MYBBSY status bit in the MISC_STAT register is set while the Universe IID asserts the BBSY* output.

The VMEbus is released (in RWD mode) when the channel (for example, the DMA Channel) is done, even if another channel has a request pending (for example, the PCI Slave Channel). A re-arbitration of the VMEbus is required for any pending channel requests. Each channel has a set of rules that determine when it is 'done' with its VMEbus transaction.

The Interrupt Channel is done when a single interrupt acknowledge cycle is complete.

The PCI Slave Channel is done under the following conditions:

- when the TXFIFO is empty (the TXFE bit is set in the MISC_STAT register)
- when the maximum number of bytes per PCI Slave Channel tenure has been reached (as programmed with the PWON field in the MAST_CTL register)
- coupled cycle is complete and the Coupled Window Timer has expired
- the Coupled Request Timer expires before a coupled cycle is retried by a PCI master, or
- when VMEbus ownership is acquired with the VOWN bit and then the VMEbus ownership bit cleared

The DMA Channel is done under any of the following conditions:

- DMAFIFO full during VMEbus to PCI bus transfers
- DMAFIFO empty during PCI bus to VMEbus transfers
- if an error is encountered during the DMA operation
- the DMA VMEbus Tenure Byte Counter has expired, or
- DMA block is complete

The Universe IID does not monitor BCLR* and so its ownership of the VMEbus is not affected by the assertion of BCLR*.

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Universe IID as VME Master

The Universe IID becomes VMEbus master as a result of the following chain of events:

1. A PCI master accesses a Universe IID PCI slave image (leading to VME-bus access) or the DMA Channel initiates a transaction.
2. Either the Universe IID PCI Slave Channel or the DMA Channel wins access to the VME Master Interface through internal arbitration.
3. The Universe IID Master Interface requests and obtains ownership of the VMEbus.

The Universe IID will also become VMEbus master if the VMEbus ownership bit is set and in its role in VMEbus interrupt handling.

The following sections describe the function of the Universe IID as a VMEbus master in terms of the different phases of a VMEbus transaction: addressing, data transfer, cycle termination, and bus release.

Addressing Capabilities

Depending upon the programming of the PCI slave image, the Universe IID generates A16, A24, A32, and CR/CSR (configuration ROM / Control and Status Register) address phases on the VMEbus. The address mode and type (supervisor/non-privileged and program/data) are also programmed through the PCI slave image. Address pipelining is provided except during MBLT cycles, where the VMEbus specification does not permit it.

The address and AM codes that are generated by the Universe IID are functions of the PCI address and PCI slave image programming or through DMA programming.

The Universe IID generates ADdress-Only-with-Handshake (ADOH) cycles in support of lock commands for A16, A24, and A32 spaces. ADOH cycles must be generated through the Special Cycle Generator.

To increase the flexibility of the Universe IID's address space programming, there are two user defined AM codes that can be programmed through the USER_AM register. After power-up, the two values in the USER_AM register default to the same VME64 user-defined AM code.

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Data Transfer Capabilities

The data transfer between the PCI bus and VMEbus is perhaps best explained by Figure 1.4 on page 1-19. The Universe IID can be seen as a funnel where the mouth of the funnel is the data width of the PCI transaction. The end of the funnel is the maximum VMEbus data width programmed into the PCI slave image. For example, consider a 32-bit PCI transaction accessing a PCI slave image with VDW set to 16 bits. A data beat with all byte lanes enabled will be broken into two 16-bit cycles on the VMEbus. If the PCI slave image is also programmed with block transfers enabled, the 32-bit PCI data beat will result in a D16 block transfer on the VMEbus. Write data is unpacked to the VMEbus and read data is packed to the PCI bus data width.

Only aligned VMEbus transactions are generated, so if the requested PCI data beat has unaligned or non-contiguous byte enables, then it is broken into multiple aligned VMEbus transactions no wider than the programmed VMEbus data width. For example, consider a three-byte PCI data beat (on a 32-bit PCI bus) accessing a PCI slave image with VDW set to 16 bits. The three-byte PCI data beat will be broken into two aligned VMEbus cycles: a single-byte cycle and a double-byte cycle (the ordering of the two cycles depends on the arrangement of the byte enables in the PCI data beat). If in the above example the PCI slave image has a VDW set to 8 bits, then the three-byte PCI data beat will be broken into three single-byte VMEbus cycles.

BLT/MBLT cycles are initiated on the VMEbus if the PCI slave image has been programmed with this capacity. The length of the BLT/MBLT transactions on the VMEbus will be determined by the initiating PCI transaction or the setting of the PWON field in the MAST_CTL register. For example, a single data beat PCI transaction queued in the TXFIFO results in a single data beat block transfer on the VMEbus. With the PWON field, the user can specify a transfer byte count that will be dequeued from the TXFIFO before the VME Master Interface relinquishes the VMEbus.

During DMA operations, the Universe IID will attempt block transfers to the maximum length permitted by the VMEbus specification (256 bytes for BLT, 2 Kbytes for MBLT) and as limited by the VON counter.

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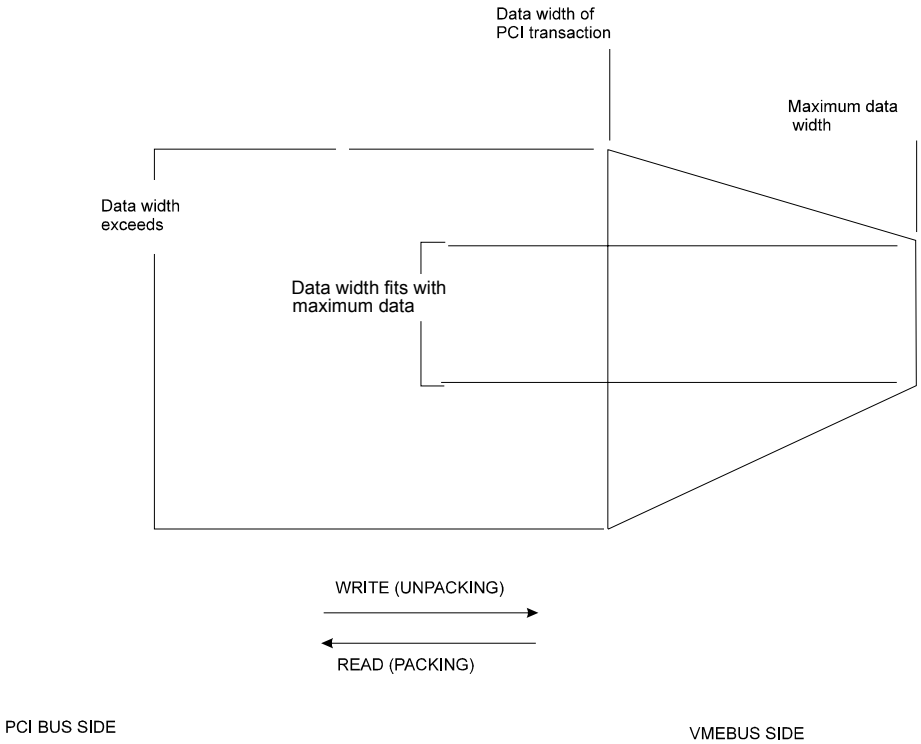

Figure 1.4 Influence of Transaction Data Width and Slave Image Data Width on Data Packing/Unpacking

The Universe IID provides indivisible transactions with the VMEbus lock commands and the VMEbus ownership bit.

Cycle Terminations

The Universe IID accepts BERR* or DTACK* as cycle terminations from the VMEbus slave. The assertion of BERR* indicates that some type of system error occurred and the transaction did not complete properly. A VMEbus BERR* received by the Universe IID during a coupled transaction is communicated to the PCI master as a target abort. No information is logged if the Universe IID receives BERR* in a coupled transaction. If an error occurs during a posted write to the VMEbus, the Universe IID uses the V_AMERR register to log the AM code of the transaction (AMERR [5:0]), and the state of the IACK* signal (IACK bit, to indicate whether the error occurred during an IACK cycle). The current transaction in the FIFO is purged. The V_AMERR register also records if multiple errors have occurred (with the M_ERR bit), although the actual number of errors is not given. The error log is qualified by the value of the V_STAT bit. The address of the errored transaction is latched in the V_AERR register. When the Universe IID receives a VMEbus error during a posted write, it generates an interrupt on the VMEbus and/or PCI bus depending upon whether the VERR and LERR interrupts are enabled.

DTACK* signals the successful completion of the transaction.

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Universe IID as VME Slave

The Universe IID becomes a VMEbus slave when one of its four programmed slave images or register images are accessed by a VMEbus master (note that the Universe IID cannot reflect a cycle on the VMEbus and access itself). Depending upon the programming of the slave image, different possible transaction types result.

For reads, the transaction can be coupled or prefetched. Similarly, write transactions can be coupled or posted. The type of read or write transaction allowed by the slave image is dependent upon the programming of that particular VME slave image (see Figure 1.5 below). To ensure sequential consistency, prefetched reads, coupled reads, and coupled write operations are only processed once all previously posted write operations have completed (i.e., the RXFIFO is empty).

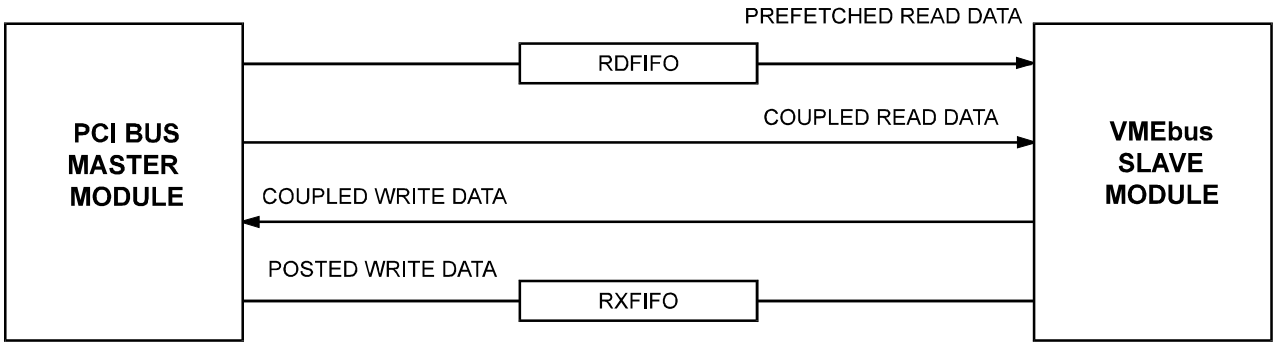

Figure 1.5 VMEbus Slave Channel Dataflow

Incoming cycles from the VMEbus can have data widths of 8-bits, 16-bits, 32-bits, and 64-bits. Although the PCI bus supports only two port sizes (32-bits and 64-bits), the byte lanes on the PCI bus can be individually enabled, which allows each type of VMEbus transaction to be directly mapped to the PCI data bus.

Note

In order for a VMEbus slave image to respond to an incoming cycle, the PCI master interface must be enabled (bit BM in the PCI_CSR register).

Coupled Transfers

A coupled transfer means that no FIFO is involved in the transaction and handshakes are relayed directly through the Universe IID. Coupled mode is the default setting for the VMEbus slave images. Coupled transfers only proceed once all posted write entries in the RXFIFO have completed. (See Posted Writes on page 1-21).

A coupled cycle with multiple data beats (i.e., block transfers) on the VMEbus side is always mapped to single data beat transactions on the PCI bus, where each data beat on the VMEbus is mapped to a single data beat transaction on the PCI bus regardless of data beat size. No packing or unpacking is performed. The only exception to this is when a D64 VMEbus transaction is mapped to D32 on the PCI bus. The data width of the PCI bus is dependent upon the

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programming of the VMEbus slave image (32-bit or 64-bit). The Universe IID enables the appropriate byte lanes on the PCI bus as required by the VMEbus transaction. For example, a VMEbus slave image programmed to generate 32-bit transactions on the PCI bus is accessed by a VMEbus D08 BLT read transaction (prefetching is not enabled in this slave image). The transaction is mapped to single data beat 32-bit transfers on the PCI bus with only one byte lane enabled.

The Universe IID does not generate RETRY* on the VMEbus, so a target-retry from a PCI slave will not be communicated to the VMEbus master. PCI transactions terminated with target abort or master abort are terminated on the VMEbus with BERR*.

Note

The Universe IID sets the R_TA or R_MA bits in the PCI_CS register when it receives a target abort or master abort.

Posted Writes

A posted write involves the VMEbus master writing data into the Universe IID's RXFIFO, rather than directly to the PCI address. Write transactions from the VMEbus are processed as posted if the PWEN bit is set in the VMEbus slave image control register. If the bit is cleared (the default setting) the transaction bypasses the FIFO and is performed as a coupled transfer (see above). Incoming posted writes from the VMEbus are queued in a 16-entry deep RXFIFO. Each entry in the RXFIFO can contain 64 address bits (with extra bits provided in an address entry for command information), or 64 data bits. Each incoming VMEbus address phase, whether it is 16-bit, 24-bit, or 32-bit, constitutes a single entry in the RXFIFO and is followed by subsequent data entries. The address entry contains the translated PCI address space and command information mapping relevant to the particular VMEbus slave image that has been accessed. For this reason, any reprogramming of VMEbus slave image attributes will only be reflected in RXFIFO entries queued after the reprogramming. Transactions queued before the reprogramming are delivered to the PCI bus with the VMEbus slave image attributes that were in use before the reprogramming.

Incoming non-block write transactions from the VMEbus require two entries in the RXFIFO: one address entry (with accompanying command information) and one data entry. The size of the data entry corresponds to the data width of the VMEbus transfer. Block transfers require at least two entries: one entry for address and command information, and one or more data entries. The VME Slave Channel packs data received during block transfers to the full 64-bit width of the RXFIFO. For example, a ten data phase D16 BLT transfer (20 bytes in total) does not require ten data entries in the RXFIFO. Instead, eight of the ten data phases (16 bits per data phase for a total of 128 bits) are packed into two 64-bit data entries in the RXFIFO. The final two data phases (32 bits combined) are queued in the next RXFIFO entry. When you add the address entry to the three data entries, this VMEbus block write has been stored in a total of four RXFIFO entries.

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Unlike the PCI Slave Channel, the VME Slave Channel does not retry the VMEbus if the RXFIFO does not have enough space to hold an incoming VMEbus write transaction. Instead, the DTACK* response from the VME Slave Interface is delayed until space becomes available in the RXFIFO. Since single transfers require two entries in the RXFIFO, two entries must be freed up before the VME Slave Interface asserts DTACK*. Similarly, the VME Slave Channel requires two available RXFIFO entries before it can acknowledge the first data phase of a BLT or MBLT transfer (one entry for the address phase and one for the first data phase). If the RXFIFO has no available space for subsequent data phases in the block transfer, then the VME Slave Interface delays assertion of DTACK* until a single entry is available for the next data phase in the block transfer.

The availability of RXFIFO entries depends upon how many transactions are queued in the RXFIFO. The VME Slave Channel permits only four transactions queued in the RXFIFO at any one time. A transaction is a VMEbus transaction with an address phase and one or more data phases. For example a single word write is one transaction. If four single word writes are queued in the RXFIFO, then the RXFIFO is considered full. If four transactions are already queued in the RXFIFO, assertion of DTACK* is delayed until one transaction is delivered to the PCI bus.

The PCI Master Interface uses transactions queued in the RXFIFO to generate transactions on the PCI bus. No address phase deletion is performed, so the length of a transaction on the PCI bus corresponds to the length of the queued VMEbus transaction. Non-block transfers are generated on the PCI bus as single data beat transactions. Block transfers are generated as one or more burst transactions, where the length of the burst transaction is programmed by the PABS bit in the MAST_CTL register.

The Universe IID always packs or unpacks data from the VMEbus transaction to the PCI bus data width programmed into the VMEbus slave image (with all PCI bus byte lanes enabled). For example, consider a VMEbus slave image programmed for posted writes and a D32 PCI bus that is accessed with a VMEbus D16 block write transaction. The VMEbus D16 write transaction is mapped to a D32 write transaction on the PCI bus with all byte lanes enabled. (However, note that a single D16 transaction from the VMEbus is mapped to the PCI bus as D32 with only two byte lanes enabled).

During block transfers, the Universe IID will pack data to the full negotiated width of the PCI bus. This may imply that for block transfers that begin or end on addresses not aligned to the PCI bus width different byte lanes may be enabled during each data beat.

If an error occurs during a posted write to the PCI bus, the Universe IID uses the L_CMDERR register to log the command information for the transaction (CMDERR [3:0]). The L_CMDERR register also records if multiple errors have occurred (with the M_ERR bit) although the actual number is not given. The error log is qualified with the L_STAT bit. The address of the errored transaction is latched in the LAERR register. An interrupt is generated on the VMEbus and/or PCI bus depending upon whether the VERR and LERR interrupts are enabled.

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Prefetched Block Reads

Prefetching of read data occurs for VMEbus block transfers (BLT, MBLT) in those slave images that have the prefetch enable (PREN) bit set. Without prefetching, block read transactions from a VMEbus master are handled by the VME Slave Channel as coupled reads. This means that each data phase of the block transfer is translated to a single data beat transaction on the PCI bus. In addition, only the amount of data requested during the relevant data phase is fetched from the PCI bus. For example, D16 block read transaction with 32 data phases on the VMEbus maps to 32 PCI bus transactions, where each PCI bus transaction has only two byte lanes enabled.

Note

The VMEbus lies idle during the arbitration time required for each PCI bus transaction, resulting in a considerable performance degradation.

With prefetching enabled, the VME Slave Channel uses a 16 entry deep RDFIFO to provide read data to the VMEbus with minimum latency. The RDFIFO is 64 bits wide, with additional bits for control information. If a VMEbus slave image is programmed for prefetching, then a block read access to that image causes the VME Slave Channel to generate aligned burst read transactions on the PCI bus. (The size of the burst read transactions is determined by the setting of the aligned burst size, PABS in the MAST_CTL register.) These PCI burst read transaction are queued in the RDFIFO and the data is then delivered to the VMEbus.

Note

The first data phase provided to the VMEbus master is essentially a coupled read, but subsequent data phases in the VMEbus block read are delivered from the RDFIFO and are essentially decoupled.

The data width of the transaction on the PCI bus (32-bit or 64-bit) depends upon the setting of the LD64EN bit in the VME slave image control register and the capabilities of the accessed PCI slave. Internally, the prefetched read data is packed to 64 bits, regardless of the width of the PCI bus or the data width of the original VMEbus block read (no address information is stored with the data). Once one entry is queued in the RDFIFO, the VME Slave Interface delivers the data to the VMEbus, unpacking the data as necessary to fit with the data width of the original VMEbus block read (e.g. D16, or D32). The VME Slave Interface continuously delivers data from the RDFIFO to the VMEbus master performing the block read transaction. Because PCI bus data transfer rates exceed those of the VMEbus, it is unlikely that the RDFIFO will ever be unable to deliver data to the VMEbus master. For this reason, block read performance on the VMEbus will be similar to that observed with block writes. However, should the RDFIFO be unable to deliver data to the VMEbus master (which may happen if there is considerable traffic on the PCI bus or the PCI bus slave has a slow response) the VME Slave Interface delays DTACK* assertion until an entry is queued and is available for the VMEbus block read.

On the PCI side, prefetching continues as long as there is room for another transaction in the RDFIFO and the initiating VMEbus block read is still active. The space required in the RDFIFO for another PCI burst read transaction is determined by the setting of the PCI aligned burst size (PABS in the MAST_CTL register). If PABS is set for 32 bytes, there must be four entries available in the RDFIFO; for aligned burst size set to 64 bytes, eight entries must be available. When there is insufficient room in the RDFIFO to hold another PCI burst read, the read transactions on the PCI bus are terminated and

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only resume if room becomes available for another aligned burst AND the original VMEbus block read is still active. When the VMEbus block transfer terminates, any remaining data in the RDFIFO is purged.

Regardless of the read request, the data width of prefetching on the PCI side is full width with all byte lanes enabled. If the request is unaligned, then the first PCI data beat will have only the relevant byte lanes enabled. Subsequent data beats will have full data width with all byte lanes enabled. If LD64EN is set in the VME Slave image, the Universe IID requests D64 on the PCI bus by asserting REQ64# during the address phase. If the PCI slave does not respond with ACK64#, subsequent data beats are D32.

The Universe IID translates errors from the PCI bus to the VMEbus during only the first data beat (the coupled portion) of the prefetched read. A target abort on the PCI bus is translated as a BERR* signal on the VMEbus. However, a target abort on subsequent data beats during a prefetched read is ignored, but does cause prefetching to stop. There is no logging of the error, and all previously fetched data is provided to the VMEbus master. Once the block read on the VMEbus extends beyond the available data in the RDFIFO, then a new prefetch is initiated on the PCI bus. The point at which the new prefetch is initiated corresponds to where the error previously occurred. If the error occurs again, it will be on the first (coupled) data beat of the transaction and will be translated to the VMEbus as a BERR* signal. As with all coupled errors, no error is logged and no interrupt is generated. It should be anticipated that two target aborts may be generated before the VMEbus block read is terminated with BERR*.

VMEbus Lock Commands

The Universe IID supports VMEbus lock commands as described in the VME64 specification. Under the specification, ADOH cycles are used to execute the lock command (with a special AM code). Any resource locked on the VMEbus cannot be accessed by any other resource during the bus tenure of the VMEbus master. If the Universe IID receives a VMEbus lock command, it asserts LOCK# to the addressed resource on the PCI bus. The Universe IID holds the PCI bus lock until the VMEbus lock command is terminated, i.e. when BBSY* is negated. All subsequent slave VMEbus transactions are coupled while the Universe IID owns PCI LOCK#. Note that the VME Slave Channel has dedicated access to the PCI Master Interface during the locked transaction.

VMEbus Read Modify Writes

A read-modify-write (RMW) cycle allows a VMEbus master to read from a VMEbus slave and then write to the same resource without relinquishing bus tenure between the two operations. Each of the Universe IID slave images can be programmed to map RMW transactions to PCI locked transactions. If the LLRMW enable bit is set in the appropriate VMEbus slave image control register, then every non-block slave read is mapped to a coupled PCI locked read. LOCK# will be held on the PCI bus until AS* is negated on the VMEbus. Every non-block slave read is assumed to be a RMW since there is no possible indication from the VMEbus master that the single cycle read is just a read or the beginning of a RMW.

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If the LLRMW enable bit is not set and the Universe IID receives a VME RMW cycle, the read and write portions of the cycle will be treated as independent transactions on the PCI bus: that is, a read followed by a write. The write may be coupled or decoupled depending on the state of the PWEN bit in the accessed slave image.

Note

There may be a performance loss for reads that are processed through a RMW-capable slave image. Some of this comes about due to the sampling of and arbitration for LOCK# by the Universe IID's PCI Master Interface. More of a performance loss can arise if LOCK# is currently owned by another PCI master.

Register Accesses

See Tundra's *Universe II™ User Manual* that is included on your SVME/DMV-179 Technical Documentation CDROM for a full description of register mapping and register access.

VMEbus Accesses

The Universe IID PCI Slave Image Control Registers control the VMEbus accesses. These registers allow you to set the following features:

- VMEbus Maximum Data Width
  - 8, 16, 32 or 64-bits
- VMEbus Address Space
  - A16, A24, A32, CR/CSR, User1 or User2
- Program/Data Address Modifier Code
  - Program or Data
- Supervisor/User Address Modifier Code
  - Non-privileged or Supervisor
- VMEbus Cycle Type
  - Single Cycle or Block Transfers

VMEbus Base Address

Both the VMEbus Slave Image Address Register and the VMEbus Slave Image Bound Address Register set the VMEbus Base address. The VMEbus Slave Image Address Register sets the low end of the VMEbus base address range, and the VMEbus Slave Image Bound Address Register sets the high end of the range.

VMEbus Configuration

The Universe IID provides the following functions to assist in the initial configuration of the VMEbus system:

- First Slot Detector
- Register Access at Power-up
- Auto Slot ID (two methods)

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Cross Reference

These are described in further detail in Tundra's *Universe II™ User Manual* that is included on your SVME/DMV-179 Technical Documentation CDROM.

System Controller Functions

When located in Slot 1 of the VME system, the Universe IID assumes the role of SYSCON and sets the SYSCON status bit in the MISC_CTL register. In accordance with the VME64 specification, as SYSCON the Universe IID provides:

- a system clock driver
- an arbitration module
- an IACK Daisy Chain Driver (DCD)
- a bus timer

System Clock Driver

The Universe IID provides a 16 MHz SYSCLK signal derived from CLK64 when configured as SYSCON.

VMEbus Arbiter

When the Universe IID is SYSCON, the Arbitration Module is enabled. The Arbitration Module supports the following arbitration modes:

- Fixed Priority Arbitration Mode (PRI)
- Single Level Arbitration (SGL) (a subset of PRI)
- Round Robin Arbitration Mode (RRS) (default setting)

Cross Reference

See Tundra's *Universe II™ User Manual* that is included on your SVME/DMV-179 Technical Documentation CDROM, for more detail.

These are set with the VARB bit in the MISC_CTL register.

IACK Daisy-Chain Driver Module

The IACK Daisy-Chain Driver module is enabled when the Universe IID becomes system controller. This module guarantees that IACKIN* will stay high for at least 30ns as specified in observation 4.41 of the VME64 specification.

VMEbus Time-out

A programmable bus timer allows users to select a VMEbus time-out period. The time-out period is programmed through the VBTO field in the MISC_CTL register and can be set to 16µs, 32µs, 64µs, 128 µs, 256 µs, 512 µs, 1024 µs, or disabled. The default setting for the timer is 64 µs. The VMEbus Timer module asserts VXBERR# if a VMEbus transaction times out (indicated by one of the VMEbus data strobes remaining asserted beyond the time-out period).

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Location Monitor

The SVME/DMV-179 does not use the Universe location monitor. It uses Mailbox0 to implement this function.

Auto-ID Function

The Auto-ID function enables the user software to determine the physical location of the circuit module and to reprogram it under software control. Cards equipped with Auto-ID can determine their relative slot address. The system firmware uses the relative slot address, in combination with other configuration information, to set the absolute slot ID or base address of the card.

Note

In order for the Auto-ID to operate predictably, all cards to the left of the SVME/DMV-179 card (if the SVME/DMV-179 does not occupy slot one) should also support the Auto-ID function. Other configurations are possible; for further information, refer to the *Foundation Firmware User's Manual*.

Cross Reference

For further information on the Auto-ID feature, refer to Tundra's *Universe II™ User Manual* that is included on your SVME/DMV-179 Technical Documentation CD-ROM.

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System Utilities

The SVME/DMV-179 connects to the System Utilities as supported by the Universe IID chip. The functions of the System Utilities are described in Table 1.4.

Table 1.4: System Utilities

System Utility	Description
System Reset	The SVME/DMV-179 monitors the SYSRESET* signal from the VMEbus. The SYSRESET* signal is asserted by the SVME/DMV-179 under the following conditions: - Universe IID power-up reset pin is asserted - assertion of the software reset control bit in the Universe IID - SVME/DMV-179 watchdog timer expires (if the watchdog is configured to perform a reset).
System Fail	The VMEbus SYSFAIL* signal is brought into one of the Universe IID level seven interrupt inputs. This enables the CPU to be interrupted on SYSFAIL* assertions. The SVME/DMV-179 can assert the SYSFAIL* signal by means of a Universe IID register. Assertion of the SYSFAIL* bit also asserts the CARDFAIL* signal on the P0 or P2 connectors and turns on the front panel FAIL LED.
AC Fail	The VMEbus ACFAIL* signal is brought into one of the Universe IID level seven interrupt inputs. This enables the CPU to be interrupted on ACFAIL* assertions.
Card Fail	When the SVME/DMV-179 drives the SYSFAIL* signal, it can assert a card fail signal. The CARD-FAIL* signal is on the P0 or P2 connector and is useful in determining which CCA in the chassis has asserted the SYSFAIL* signal.
Bus Error	The SVME/DMV-179 asserts the VMEbus Bus Error (BERR*) signal when one of the following situations occur: - a VMEbus master attempts to write to a protected location on the SVME/DMV-179 - the SVME/DMV-179 is the System Controller and a VMEbus time-out occurs.

Mailboxes

The Universe IID includes four 32-bit mailbox registers. Because these mailbox registers are located in the register space, they are accessible by both the VME and PCI buses, via the normal register access mechanisms. Each mailbox is capable of generating an interrupt on either bus.

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Memory

Memory Controller

The GT-64130 chip decodes the address bus for DRAM and most nonvolatile accesses and provides timing control for these devices. Various registers within the GT-64130 support the memory accesses.

DRAM

The SVME/DMV-179 supports up to 2 banks of 64 or 128 Mbyte SDRAM offering either 128 or 256 Mbytes with Error Detection and Correction (EDAC). The EDAC function provides one-bit error detection and correction and two-bit error detection only. The EDAC logic within the GT-64130 will also detect all errors within a nibble. The DRAM is accessible from the processor and PCI buses.

Write accesses to DRAM of less than longword width (64 bits) result in running a Read-Modify-Write (RMW) cycle to ensure the check bits are generated across all bytes. If the EDAC function is disabled, then write accesses of less than a longword width will not result in RMW cycles.

Cache Coherency

The SVME/DMV-179 does not support hardware-enforced cache coherency of L1 and L2 caches against PCI/VME accesses to DRAM. Coherency must be enforced in software. There are two ways to do this:

- buffers can be allocated from un-cached memory or
- buffers can be explicitly managed using cache flushes and invalidates as appropriate.

These buffers must be cache-line aligned. A cache-line on the SVME/DMV-179 is 32 bytes. This means all buffers must start and end on a 32-byte boundary.

If you are using VxWorks on your card, see the *SVME/DMV-179 Tornado 2.0 BSP Software User's Manual* for more details.

L2 Cache

The PowerPC 750 and 7400 RISC processors used on the SVME/DMV-179 include an on-chip L2 cache controller capable of accessing external synchronous SRAM via a dedicated (backside) L2 cache port. This implementation frees up the local memory resource for other bus masters and improves the CPU's performance.

The L2 cache may be 256 Kbytes to 2 Mbytes of synchronous pipelined cache memory. The MPC750 is limited to 1 Mbyte and the 7400 is limited to 2 Mbytes.

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Non-Volatile Memory

The SVME/DMV-179 provides six areas of nonvolatile memory. These are a 64-bit wide Flash bank, the permanent alternate boot site (8-bit Flash), the Debug Flash (Boot PROM), the NOVRAM, and the two serial EEPROMs.

64-bit Flash

The 64-bit wide Flash banks are located on the memory bus, and support up to 48 Mbytes of Flash.

This memory provides fast access times and is suitable for the CPU to execute code from. This memory is readable as byte, halfword, word, or double word.

64-bit Flash Protection

The Flash consists of up to three 16 Mbyte banks. The boot bank provides space for boot code and applications.

The boot bank can be write-protected using the BOOT_WP bit in the EEPROM General Control Register (page 3-11). The two remaining banks can be write protected using the APP_WP bit in the Miscellaneous Control Register (page 3-12). Hardware-configurable jumpers are also provided for Flash write protection.

Note

The SVME/DMV-179 does not support write protection of individual sectors through a software write sequence to the Flash devices.

Permanent Alternate Boot Site

An 8-bit boot bank is provided for booting a card in the case where the 64-bit Flash is corrupted. To boot from this site, connect P0 pin A10 to ground OR connect E48 - E49.

Debug Flash (Boot PROM)

A 32-pin JEDEC DIP site is available on the back of the card to facilitate booting a card in the case where both the 64-bit Flash and the permanent alternate boot site are corrupted. This socket supports up to a 512 Kbytes Flash device (e.g. 29F040B). This device is only for use in a test/debug environment, since any device installed in this socket will violate the VMEbus envelope specification. To boot from this site, disconnect P0 pin A10 from ground, remove E48 - E49, and insert the jumper E6 - E7.

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NOVRAM

The SVME/DMV-179 provides 32 Kbytes of Autostore Non-Volatile Static RAM, through a Simtek STK14C88 device. This device is a fast static RAM with a nonvolatile EEPROM element incorporated in each memory cell. The SRAM can be written an unlimited number of times, while the independent nonvolatile data resides in EEPROM. Data is transferred (stored) from the SRAM to the EEPROM automatically upon power-down. Data is restored (recalled) from the EEPROM to the SRAM automatically on power-up. Store and Recall operations can also be initiated under software control.

The software initiated Store cycles take a maximum of 10 ms to complete. The power-down initiated Store cycles take a maximum of 12 ms to complete, and a capacitor on the SVME/DMV-179 card maintains power to the device for this period. The Recall cycle completes in a maximum of 20µs, measured from the point in the power-up sequence at which Vcc reaches +4.5V.

Serial EEPROM

The SVME/DMV-179 provides two individual serial EEPROM devices, with capacities of 512 bytes and 256 bytes.

The 256 byte serial EEPROM is used by the Ethernet/SCSI controller, and its prime function is to hold the Ethernet station address for the card. The remaining memory in this serial EEPROM is fully available to the user.

The 512 byte serial EEPROM is used by the FPGA. The Foundation Firmware uses part of this store and the rest of the memory is fully available to the user.

Non-Volatile Memory Map

The memory map is configured such that when the PowerPC processor boots, its first address is FFF0 0100. The jumpers E6 - E7, E48 - E49, and P0 pin A10 determine whether this address is mapped to the 64-bit Flash, the permanent alternate boot site, or the boot PROM.

Cross Reference

For information on the use of this jumper, refer to Chapter 2 of the *Getting Started Manual*.

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Memory Interfaces

The memory blocks are connected to the PowerPC processor via different interfaces. The GT-64130 memory controller controls the DRAM memory, the 64-bit Flash bank, and the boot PROM. All these memory sources connect to the PowerPC through the GT-64130.

The Ethernet controller and the FPGA control the two serial EEPROMs. As illustrated in Figure 1.6, the NOVRAM is connected to the peripheral bus, and controlled by the peripheral bridge.

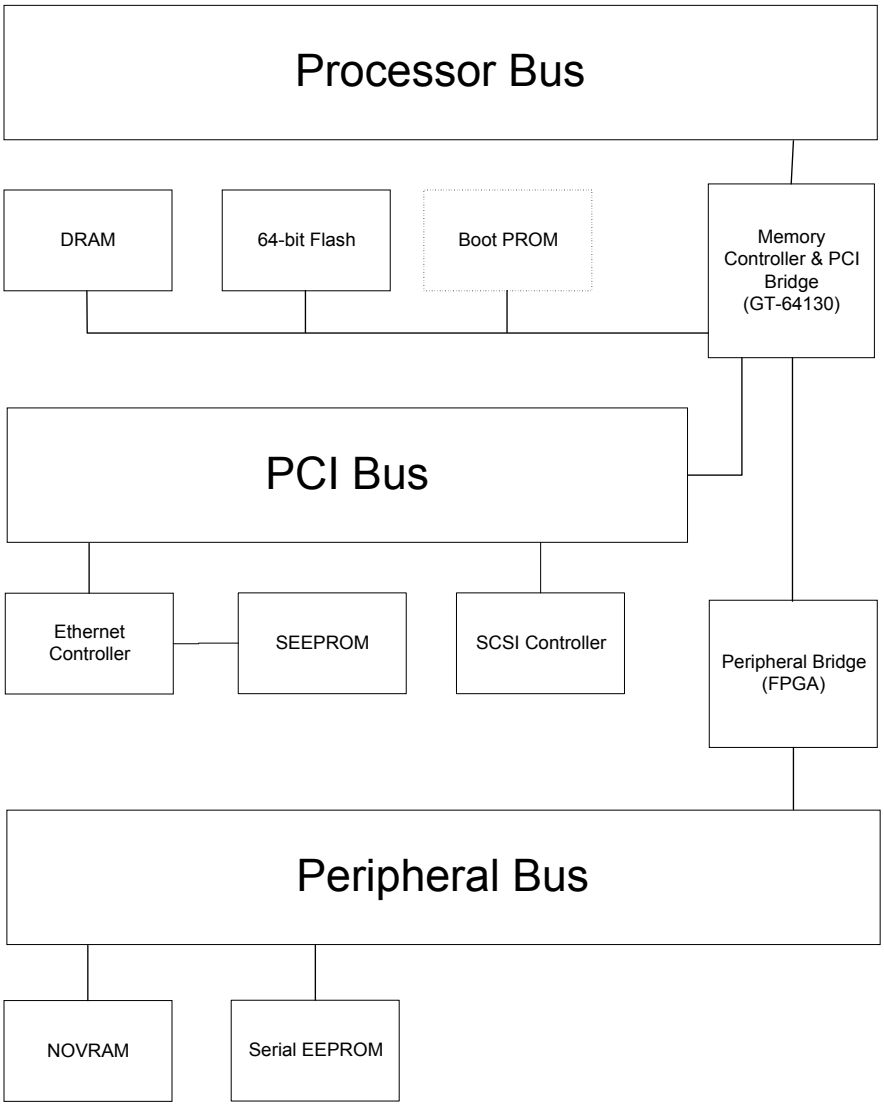

Figure 1.6 Memory Interfaces

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Instruction and Data Cache Support

The PowerPC 7400 and 750 processors both provide internal L1 cache: 32 Kbytes of instruction cache and 32 Kbytes of data cache.

L1 Cache Support

The L1 instruction and data caches are enabled or disabled under software control through the cache control registers within the processor. No hardware mechanism is provided for inhibiting the L1 caches.

L2 Cache Support

The SVME/DMV-179 supports an L2 dedicated (backside) cache. This frees up the local memory for other bus masters and improves CPU execution performance.

Reset

Inputs

The VME reset input (SYSRST-) causes the SVME/DMV-179 to reset. This input is connected through P1-C12 of the backplane.

There is also a reset input (FP_RESET) on the front panel connector that connects to the reset button on the front panel cable. This signal is also available at P0-C3 of the backplane.

Outputs

The SVME/DMV-179 generates a VME reset when:

- the Universe IID power reset is asserted,
- the Universe IID software system reset is issued, or
- a watchdog timeout occurs and it is configured to cause a system reset.

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JTAG

JTAG support on the SVME/DMV-179 consists of the PowerPC COP interface available at the front panel J9 connector on an SVME-179 and a JTAG test chain used to detect and isolate manufacturing defects during factory testing.

The PowerPC COP interface on the SVME-179 front panel can be accessed using a front panel I/O cable (CBL-179-001 or CBL-SBC-FP-000). The test interface is available on the P0 connector JTAG test chain.

The JTAG test chain is configurable. In the default configuration, only the CPU is in the test chain. To enable the entire test chain, insert the CHAIN_ENABLE jumper (E55 - E56).

The JTAG test chain for PWB 310939-004, from input to output, is shown in Figure 1.7. Figure 1.8 shows the JTAG test chain for older PWBs.

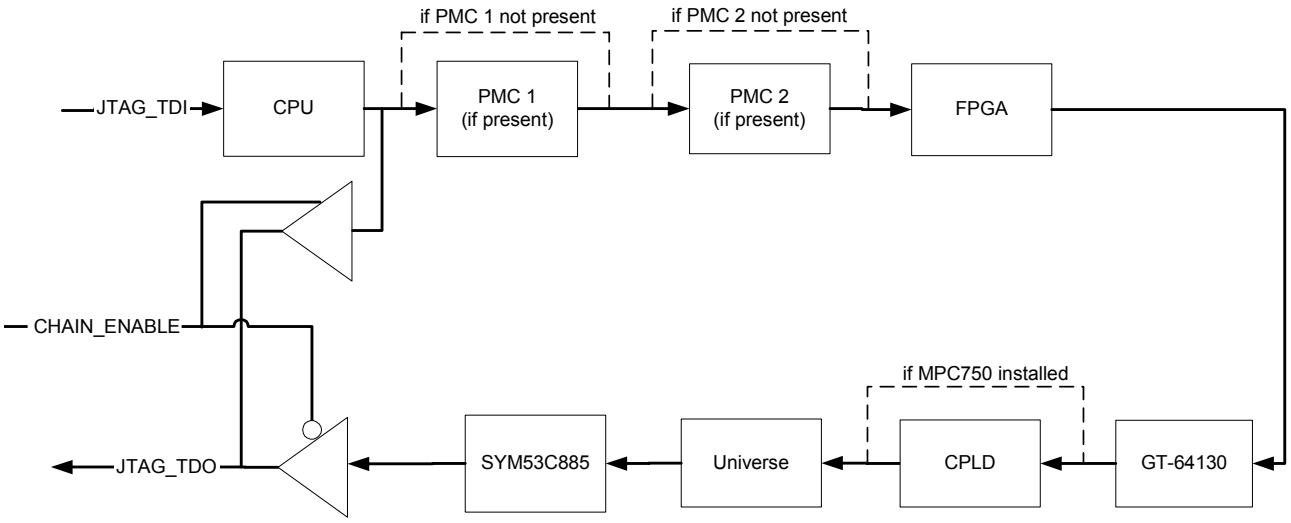

Figure 1.7 JTAG Test Chain for PWB 310939-004

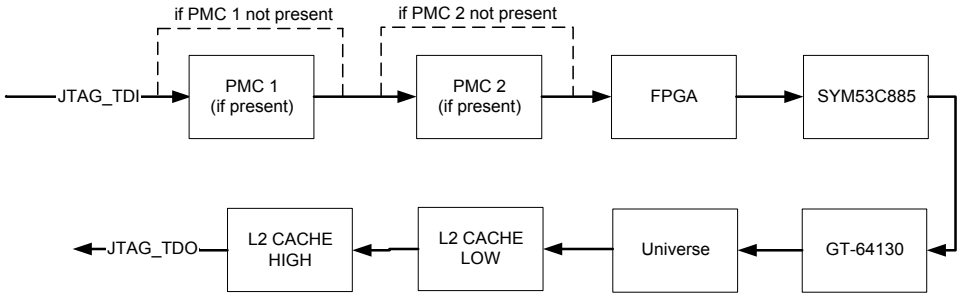

Figure 1.8 JTAG Test Chain for Older PWBs

Note

The PMC module sites are included in the JTAG chain. When a PMC module is not present, a logic gate causes the PMC site to be bypassed.

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Serial Data Interfaces

The SVME/DMV-179 provides two EIA-232 and two EIA-422/485 compatible serial data I/O interfaces.

EIA-232 Interface

The Exar ST16C550 UART with 16-byte FIFOs chip provides two NS16C550-compatible EIA-232 channels and supports asynchronous operation.

The EIA-232 serial data interfaces are accessible from either:

- the front panel (SVME-179 only)
- the P0 and P2 connectors (SVME/DMV-179)

The TTL-level signals from the chip are buffered through EIA-232-D drivers and receivers.

Cross Reference

Refer to the *SVME/DMV-179 Getting Started Manual* for pin-out details of the relevant connectors, and to the *Product Release Notes* that were included with your SVME/DMV-179 to ascertain where the EIA-232 serial ports are factory configured to be available.

Baud Rates

The EIA-232 serial channels have independent software-programmable baud rates from 50 to a maximum of 115.2 Kbps. The EIA-232 serial ports can generate interrupts to the FPGA, which provides the interrupt controller function for the SVME/DMV-179.

On the P0 and P2 connectors, the UART provides the basic transmit and receive signals on two channels. In addition, the transmit and receive signals are supplemented for one channel by the addition of the Data Set Ready (DSR) signal. The DSR signal is used in conjunction with the SW0 jumper E2-E4 (also known as the User Link) to determine the initial execution sequence. Typically, the DSR signal allows the decision of whether the card powers up in the General Purpose Monitor (GPM) or the Default Application.

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EIA-422/485 Interface

Serial channels 3 and 4 of the SVME/DMV-179 are EIA-422/485-capable channels provided by a Zilog 85230 ESCC (Enhanced Serial Communications Controller). Each channel includes TxD, RxD, TxClk, and RxClk/CTS signals. In asynchronous mode, RxClk/CTS can be used as a general purpose status input that is connected to the CTS input of the 85230.

The EIA-422/485 serial interface signals are accessible on either the P0 or P2 connectors, depending on the card's I/O configuration.

Note

The NSC DS26C32ATM is used as the EIA-422/485 differential line receiver. This device is compliant with EIA-422. It is EIA-485-compliant with the exception of the common-mode voltage.

Asynchronous Operation

When configured for asynchronous operation, the EIA-422/485 channels can be independently programmed to provide standard baud rates: 300, 600, 1200, 2400, 9600, 19200, 38400, 76800, 153600.

Synchronous Operation

The 85230 ESCC is a multi-protocol device capable of supporting synchronous protocols such as HDLC/SDLC. The 85230 is clocked at 10 MHz, allowing it to operate at bit rates up to 1.6 Mbps.

DMA Support

To support high data rate applications without excessive loading of the PowerPC CPU, two of the general purpose DMA controllers provided by the bridge chip are available to the transmitter and receiver of serial channel 3.

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Ethernet Interface

The SVME/DMV-179 card provides a fast Ethernet interface using the SYM53C885 PCI-SCSI/Fast Ethernet Multi-function Controller. The interface is either 10Base-T or 100Base-TX, and is optionally available on the P0 or P2 connector and on the front panel J9 connector. The 10Base-T twisted pair interface can carry data at 10 Mbps for a maximum distance of 185 meters. The 100Base-TX twisted pair interface can carry data at 100 Mbps for a maximum distance of 100 meters.

Cross Reference

Refer to Chapter 2 for details on where the Ethernet signals can be routed, and to the *Product Release Notes* for your particular card, to find out how this card has routed these signals. The SYM53C885 connects to the PCI Bus and has its own integral DMA controller with programmable burst size.

The SYM53C885 provides large on-chip FIFOs to minimize the host CPU load and provide the maximum flexibility for the interface.

SYM53C885 Features

The SYM53C885 dual-port chip provides the following features:

- on-chip buffers
- DMA architecture
- energy-saving power-down modes

The Symbios SYM53C885 device provides several functions on the SVME/DMV-179. It acts as the controller for the PCI bus and provides the SCSI and Ethernet interfaces.

Station Address

The Ethernet station address for your SVME/DMV-179 has been programmed into the associated serial EEPROM device. This serial EEPROM is accessed through the SYM53C885 registers.

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Ethernet Status LEDs

The SVME/DMV-179 provides on-card LEDs to indicate status related to the Ethernet interface. The functions and reference designators are given in Table 1.5.

Table 1.5: Ethernet Status LEDs

Transceiver Type	Reference Designator	Function
ICS	DS5	Receive Data LED
	DS6	Transmit Data LED
	DS7	Collision LED
Broadcom	DS5	Link LED
	DS6	Receive Data LED
	DS7	Transmit Data LED

Note

The signal that controls the assertion of the transmit and receive data LEDs is stretched to ensure a single packet will be seen. If the packet stream is continuous, the LED will appear permanently on.

SCSI Interface

The SVME/DMV-179 supports the SCSI bus for mass storage sub-systems (such as the SVME/DMV-570) by means of an on-card Symbios SYM53C885 PCI-SCSI/Fast Ethernet Multifunction Controller providing a PCI 2.1 compliant interface. The SYM53C885 resides on the PCI bus and integrates a high-performance SCSI core, a PCI bus master DMA core, and the SYMSCSI SCRIPTS processor. It supports SCSI-1, SCSI-2 (Fast SCSI), and SCSI-3 (Wide Ultra SCSI) standards and 8-bit and 16-bit port sizes. The SYM53C885 is designed to implement multi-threaded I/O algorithms with a minimum of host processor intervention.

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SCSI Features

The main features of the SCSI portion of the SYM53C885 include the following:

- performs high-speed single-ended SCSI bus transfers up to 40 Mbytes/s synchronous,
- bursts of up to 128 double words of data across PCI bus using 536-byte DMA FIFO,
- internal high-speed DMA controller,
- functions as a full 32-bit PCI DMA bus master.

Cross Reference

For further information on the SYM53C885, refer to Symbios data sheet.

Transfer Rates

When enabled for SCSI-3 operation, the interface is capable of 20 Mtransfers/s (synchronous). This is 20 MBytes/s in an 8-bit configuration and 40 Mbytes/s in a 16-bit configuration.

SCSI I/O Pinout

Cross Reference

SCSI control and data signals for 8-bit SCSI operation are available at rows d and z of the P2 connector in the standard I/O configuration. 16-bit SCSI is factory-configurable to be available on the P2 connector only. Consult your *Product Release Notes* to determine the configuration of your card.

SCSI Bus Interface

The SCSI interface on the SVME/DMV-179 is configured for single-ended operation. Inputs provide signal filtering to increase immunity to signal reflections. Outputs are isolated from the power supply to ensure that there is no adverse effect on the active SCSI bus when in power down mode.

The interface uses regulated active terminations to achieve high performance as recommended by the SCSI-2 and SCSI-3 standards.

Note

If the SCSI interface on the SVME/DMV-179 is not going to be located at the end of a cable segment, then the active terminators should be placed into a power-down mode so that they are effectively disconnected from the bus.This is achieved by means of the SCSI_PD bit in the EEPROM General Control Register.

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SCSI Control

As a SCSI controller, the SYM53C885 can operate in the low-level register interface mode or it can use SCSI SCRIPTS.

Low-Level Register Interface

With the low-level register interface, the user has access to the DMA control logic and the SCSI bus control logic; this access is useful for backward compatibility. Low-level mode also allows operation in loopback mode, in which the SCSI core can be directed to talk to the DMA core to test internal data paths out to the device pins.

SCSI SCRIPTS

To operate in the SCSI SCRIPTS mode, the SYM53C885 requires only a SCRIPTS start address. The start address must be at a word (four byte) boundary. The SYM53C885 fetches and executes its own instructions by becoming a bus master on the PCI bus, fetching two or three 32-bit words into its registers.

The SCSI SCRIPTS mode of execution allows the SYM53C885 to make decisions based on the status of the SCSI bus, so that the processor does not have to service all of the interrupts inherent in I/O operations. The SCSI SCRIPTS mode is also capable of handling error recovery.

The SYM53C885 implements five types of SCRIPTS instructions:

- Block Move - moves data between the SCSI bus and memory
- I/O Read or Write - causes SYM53C885 to trigger common SCSI hardware sequences, or to move registers
- Transfer Control - allows SCRIPTS instructions to make decisions based on real-time SCSI bus conditions
- Memory Move - allows block moves between different parts of main memory
- Load and Store - moves data between memory and internal registers without using the Memory Move instruction

Fast-20 SCSI

Fast-20 is an extension of the SCSI-3 standard that expands the bandwidth of the SCSI bus and allows faster synchronous SCSI transfer rates. When enabled, Fast-20 performs 20 megatransfers per second during I/O operations, which results in an approximate doubling of the SCSI transfer rates of fast SCSI-2.

Cross Reference

Refer to the manufacturer's datasheet for this device for further programming information.

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Real Time Clock (RTC)

The RTC connects to the peripheral bus and is accessed through the FPGA. The RTC feature on the SVME/DMV-179 is provided by either a Dallas Semiconductor DS1685QN-5 or a Benchmarq BQ3285. These devices also provide 242 bytes of general nonvolatile storage.

Note

The DS1685QN-5 RTC contains registers for century, year, month, date of month, day-of-week, hours, minutes, and seconds. The BSP software ensures that the SVME/DMV-179 is Year 2000 compliant.

RTC Interrupts

The Benchmarq and Dallas RTCs generate three types of interrupts:

- periodic
- alarm
- update-ended interrupt

These interrupts are discussed in the following sections.

The Dallas RTC adds three additional interrupts:

- wake-up
- kickstart
- RAM clear

Cross Reference

These features are discussed in the Dallas datasheet.

Periodic Interrupt

The periodic interrupt causes the RTC interrupt request to be asserted from once every 500 ms to once every 122 µs. The periodic interrupt can be used with software counters to measure input, create output intervals, and await the next needed software function.

Alarm Interrupt

The alarm interrupt can be generated from once per second to once per day.

Update-ended Interrupt

The RTC maintains a user copy of the time information, allowing accuracy of the values independent of reading and writing the time, calendar, and alarm buffers. The RTC executes its update cycle once per second. The update-ended interrupt, if enabled, generates an interrupt after every update cycle that indicates that over 999 ms are available to read valid timeout date information.

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RTC Power Supply

The RTC draws its power from the standard +5 V input during normal operation. When the standard +5 V power is not available, the RTC draws power from the +5 V STDBY line.

RTC Built-In Test

RTC built-in test (BIT) is **not** run on power-up. The only way to run RTC BIT is to call the diagnostic from an application.

Local Registers

The SVME/DMV-179 provides local registers that control the operation of the card, or report the status of it.

The local registers provided by the SVME/DMV-179 are as follows:

- Miscellaneous Register
- PMC Control and Status Register
- EEPROM General Control Register
- Support Device Interrupt Status Register
- PCI Device Interrupt Status Register
- Support Device Interrupt Mapping Register
- PCI Interrupt Mapping Register
- PLD Version Register
- Timer 0 Count Register
- Timer 1 Count Register
- Timer 2 Count Register
- Timer Control Register 0
- Timer Control Register 1
- Discrete Digital I/O Data Register
- Discrete Digital I/O Direction Register
- Discrete Digital I/O Interrupt Enable Register
- Discrete Digital I/O Interrupt Status Register
- Discrete Digital I/O Interrupt Edge Register
- Watchdog Register

Cross Reference

For further details on the functions provided by the Local Control and Status Registers, refer to Chapter 3, Programming Interface.

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Bridge Functions

The SVME/DMV-179 implementation uses a number of different industry standard open buses. Connection between these buses takes place via bridge devices. There are three bridges on the card. The first, the Galileo GT-64130, connects the PowerPC bus to the PCI bus, the FPGA connects the PowerPC bus to the peripheral bus, and the Universe IID connects the PCI bus to the VMEbus. These bridges are discussed further in the following sections.

PowerPC to PCI Bridge

The Galileo GT-64130 provides an integrated high-bandwidth, high-performance interface between the PowerPC processor, the peripheral bus, the PCI bus, and the main memory.

The Galileo GT-64130 System Controller for PowerPC Processors converts protocols used by the PowerPC to the protocols detailed in *The Peripheral Component Interconnect (PCI) Specification* Rev. 2.1. It is a bidirectional device, supporting accesses from the PowerPC bus to the PCI Bus, and from the PCI Bus to the PowerPC Bus.

Figure 1.9 shows the functional block diagram of the Galileo GT-64130 System Controller for PowerPC Processors.

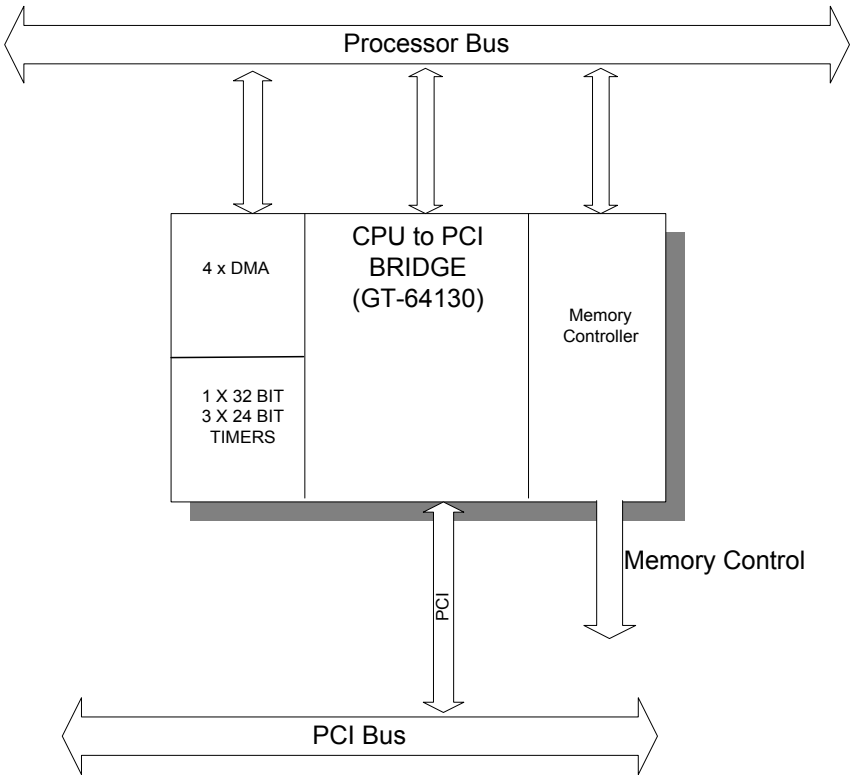

Figure 1.9 GT-64130 Bridge Functional Block Diagram

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PowerPC to Peripheral Bridge

The FPGA provides the bridge between the PowerPC bus and the peripheral bus, enabling PowerPC access to the SVME/DMV-179 8-bit peripherals.

PCI to VME Bridge

The PCI to VMEbus bridge function is implemented by means of the Tundra Universe IID device. The Universe IID provides a master/slave VME interface and can provide system controller functions if the SVME/DMV-179 card is placed in slot 1.

Cross Reference

Refer to Tundra's *Universe II™ User Manual*, which is included on your SVME/DMV-179 Technical Documentation CDROM, for further information on programming the Universe IID.

PMC Slots

The SVME/DMV-179 provides two expansion PMC slots compatible with P1386.1/Draft 2.0 04-Apr-1995, Draft Standard Physical and Environmental Layers for PCI Mezzanine Cards. The PMC slots on the SVME/DMV-179 allow a diversity of I/O functions to be installed on the card to enhance the I/O capability of the card.

PMC I/O

I/O from PMC Slot 2 is accessible at the P2 connector. I/O from PMC Slot 1 is accessible at the P0 connector.

Cross Reference

Refer to the *Product Release Note* for your particular card to ensure that no basecard I/O functions have been configured onto the P0 and P2 pins required for the PMC I/O. Use the pinout configurator application (delivered on the Technical Documentation CD-ROM) to generate P0 and P2 pinout tables for your combination of SVME/DMV-179 basecard and PMC modules.

PMC Voltage Keying

The PMC Specification supports the concept of voltage keying pins in order to ensure that both the host card and the PMC cards can work together without damage. The keying pins are mounted on the host card and indicate whether the bus between the two cards operates at +5 V or +3.3 V. A stand-off is installed in one of two positions to indicate which voltage is used, and there is a corresponding hole in the mezzanine card.

The PCI bus on the SVME/DMV-179 operates on the +5 V signalling level and provides a +5 V keying pin near the connectors. This means that the PMC interface is only compatible with PMC cards that can accept +5 V basecards.

PMC Connectors

Depending on the functionality provided by the host card, anywhere from one to five connectors may be used to implement the interface. On the SVME/DMV-179, four connectors for each PMC module implement the PMC interfaces. Three of these provide the 64-bit PCI interface and the other connector provides the 64 user I/O lines for the PMC module.

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Tip

Use the pinout configurator application delivered on the Technical Documentation CD-ROM to generate P0 and P2 pinout tables for your combination of SVME/DMV-179 and PMC modules.

PMC Front Panels

If no PMC modules are installed on the SVME- 179, the card provides CMC Slot Fillers in the front panel cut-outs for the PMC cards. To install PMC cards, remove these panels to allow the bezel on the PMC module to fill the space.

PMC Interrupts

SVME/DMV-179 cards using PWB -005 or earlier support only INTA. INTB, INTC, and INTD are not supported.

PWBs -006 will support all four PMC interrupts on each PMC slot.

Timers

Table 1.6 summarizes the Counter/Timers available on the SVME/DMV-179.

Table 1.6: SVME/DMV-179 Counter/Timers

H/W Timer	Width (bits)	Resolution	Duration
GT-64130 #0	32	15 ns	64.3 sec
GT-64130 #1	24	15 ns	251.6 ms
GT-64130 #2	24	15 ns	251.6 ms
GT-64130 #3	24	15 ns	251.6 ms
PowerPC Decrementer	32	59.9 ns	257.2 sec
PowerPC Time Base Register	64	59.9 ns	35,033 years
FPGA Watchdog	24	1 µs	16.77 sec
RTC	16	1 s as a clock 122 µs to 500 ms (interrupt generation)	 500 ms
FPGA #1	16	1 µs	65.5 ms or 71.6 min when FPGA #1 and #2 are cascaded
FPGA #2	16	1 µs	65.5 ms or 71.6 min when FPGA #1 and #2 are cascaded
FPGA #3	16	1 µs	65.5 ms

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FPGA Timers

The three cascadable timers in the FPGA are 16-bit presettable devices. When enabled, Timer 0 counts down with a resolution of 1 µs. Timers 1 and 2 are configurable to either count down with a resolution 1 µs, or be clocked from the previous timer. That is, Timer 2 may be clocked when Timer 1 expires and Timer 1 may be clocked when Timer 0 expires.

The registers that control the timers are described starting on page 3-19. When writing to these 8-bit registers, the first write programs the timer count LSB and the second write programs the timer count MSB. When reading these registers, the first read will provide the timer count LSB and latch the timer count MSB. The subsequent read provides the timer count MSB that was previously latched.

Note

When timers are cascaded, the least significant counter counts down to zero before clocking the next stage. This counter then resets to a full count of FFFFh, rather than the value that was loaded. Thus, the overall counter operates like a 32-bit or 48-bit counter.

Watchdog Timer

The watchdog timer on the SVME/DMV-179 is a presettable down-counter with a resolution of 1 µsecond. Time-out periods from 1 µsecond to 16 seconds can be programmed. Initialization software can select whether a watchdog time-out causes an interrupt or a card reset. Once enabled to cause a reset, the watchdog cannot be disabled. A watchdog time-out log bit tells start-up code whether the last card reset was due to a watchdog time-out.

If the jumper E3-E5 is connected, the watchdog timer is disabled following powerup. If the jumper E3-E5 is open, the watchdog timer is enabled following powerup and it generates a reset on timeout.

GT-64130 Timer/Counters

Each of the GT-64130 timer/counters can be selected to operate as a timer or as a counter. In counter mode, the counter counts down to terminal count, stops, and issues an interrupt. In timer mode, it counts down, issues an interrupt on terminal count, reloads itself to the programmed value, and continues to count.

Reads from the counter/timer are done from the counter itself, while writes are to its register.

To reprogram a timer/counter:

1. Disable it.
2. Load it with the new value.
3. Enable it.

Note

Even though the registers are programmed to an initial value of "0", the counters will read FFFFh.

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Cross Reference

The timer/counter registers for the GT-64130 are defined in the *Galileo Technology GT-64130 User's Manual*. For your convenience, the SVME/DMV-179 Technical Documentation CD-ROM contains links to component vendors' web sites.

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DMA Controllers

The GT-64130 has four independent DMA controllers. The DMA controllers can be used to optimize system performance by moving large amounts of data between devices on the SVME/DMV-179 without significant CPU intervention. This frees the CPU and allows it to continue executing other instructions while the data is being transferred.

Each DMA transfer uses one of two internal 64-byte FIFOs for moving data. Data is transferred from the source device into an internal FIFO, and then from the FIFO into the destination device. The DMA controller can be programmed to move up to 64 Kbytes of data per transaction. The burst length of each transfer of DMA can be set from 1 to 64 bytes. Accesses can be non-aligned in both the source and destination.

There are two 72-byte FIFOs available for the use of the DMA engines. (Although the maximum DMA burst size is 64 bytes, the extra 8 bytes in the FIFO are required for non-double word aligned transfers.) These two FIFOs allow for concurrency between two DMA transactions.

The DMA channels support chained mode of operation. The descriptors are stored in memory, and the DMA engine moves the data until the Null Pointer is reached.

Fly-By DMA transfers are also supported to and from a device or to and from SDRAM.

A DMA transfer can be initiated by the CPU writing a register, a request via a DMAReq* pin, or from a timer/counter.

Cross Reference

The DMA registers are defined in the *Galileo Technology GT-64130 User's Manual*. For your convenience, the SVME/DMV-179 Technical Documentation CD-ROM contains links to component vendors' web sites.

Reset Supervisor

The Maxim MAX-807 microprocessor supervisory circuit provides a stable power-up circuit, generating the PWRRST- signal to the Universe IID which is asserted for 200 ms after the card Vcc rises above the reset threshold (maximum 4.75 V). It also asserts reset if Vcc drops below the reset threshold. The Universe IID in turn generates the reset signal for the rest of the card resources.

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Discrete Digital I/O

The SVME/DMV-179 provides twelve individually-programmable I/O lines. These I/O lines are available on the P0 connector. Inputs are filtered in hardware such that transitions which are less than three PCI clock periods are not recognized. 10 kΩ pull-up resistors to 5 V are provided on each line. The maximum source current is 12 mA. The maximum sink current is 16 mA. There is no protection for the I/O.

For Vo = GND, the output short circuit current is in the range -15 mA to -180 mA. For Vo=Vcc, the output short circuit current is in the range 40 mA to 210 mA. Output short circuit currents apply for only one output at a time. Duration should not exceed 30 seconds.

Each I/O line is configurable through software to operate as an input or an output. Each I/O line may also generate an interrupt on either a rising or a falling edge. See “Discrete Digital I/O Interrupt Edge Register” on page 3-27 for more information.

The signal levels are compatible with TTL and LVTTL. That is, they are compatible with the LVTTL signal standard with 5 V-tolerant inputs.

For outputs, a logic 0 is in the range 0 to 0.4 V; a logic 1 is in the range 2.4 V to 3.3 V. The output current is 24 mA.

For inputs, a logic 0 must be in the range -0.5 V to +0.8 V; a logic 1 must be in the range 2.0 V to 5.5 V.

Warning

Input voltages below -0.5 V and above 5.5 V may cause component damage on the SVME/DMV-179.

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Chapter 2
Connector Pin Assignments

In this chapter...

This chapter identifies and provides pin assignments, complete with electrical characteristics, for the following connectors:

- P0;
- P1;
- P2;
- J9 front panel connector; and
- J1-J8 PMC connectors.

This chapter also includes (starting on page 2-44) a section describing the SVME/DMV-179 Pinout Configurator Utility, which is delivered on the SVME/DMV-179 Technical Documentation CD-ROM. You can use this utility to generate pinout tables that reflect the configuration of your SVME/DMV-179 basecard while also factoring in the type and slot location of any PMC modules installed on the basecard.

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I/O Routing Options

The I/O routing of the SVME/DMV-179 can be factory-configured in a number of modes to facilitate its use in various backplane configurations. The pin-out modes supported by the SVME/DMV-179 are shown in Table 2.1. Subsequent pin-out tables show complete pin-out information for each mode.

Table 2.1: I/O Routing Options

Mode	Description	Front Panel (air cooled cards only)	P0 Connector	P2 Rows A & C	P2 Rows D & Z
#1 Native	'178/'179 VME64x Configuration (5-row P1/P2, 95-pin P0)	- 2x EIA-232 - Ethernet - JTAG/COP interface - external card reset in	- PMC Site #1 I/O - 1x EIA-232 - discrete digital I/O - cardfail status out - external card reset in - JTAG test chain	- PMC Site #2 I/O	- Ethernet - SCSI (8-bit) - 2x EIA-232 - 2x EIA-422/485
#2	Optional '176/'177 P0/P2 Compatibility Mode	- 2x EIA-232 - JTAG/COP interface - external card reset in	- Ethernet - SCSI (8-bit) - 2x EIA-232 - 2x EIA-422/485 - discrete digital I/O - cardfail status out - external card reset in - JTAG test chain	- PMC Site #2 I/O	- Ethernet - SCSI (8-bit) - 2x EIA-232 - 2x EIA-422/485
#3	Optional '176/'177 P2-only Compatibility Mode	- 2x EIA-232 - JTAG/COP interface - external card reset in	- P0 connector not installed	- Ethernet - SCSI (8-bit) - 2x EIA-232 - 2x EIA-422/485 - cardfail status out	- Ethernet - SCSI (8-bit) - 2x EIA-232 - 2x EIA-422/485
#4	Optional 16-bit SCSI Mode	- 2x EIA-232 - Ethernet - JTAG/COP interface - external card reset in	- PMC Site #1 I/O - 1x EIA-232 - discrete digital I/O - cardfail status out - external card reset in - JTAG test chain	- PMC Site # 2 I/O	- Ethernet - SCSI (16-bit) - 2x EIA-232 - 1x EIA-422/485 (no TxClk)

Note

Optional I/O routings are controlled by factory-set configuration links. Boards with other than the standard routing are built to order and set-up charges may apply.

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P0 Connector Pin Assignments

Tables 2.2 and 2.3 show what signals are available from the P0 connector of the SVME/DMV-179. Some P0 pins may be used for alternate PMC signals. Substitution of the basecard signals for alternate PMC module signals is performed via factory configuration. Figure 2.1 on page 2-6 shows the location of the contacts on the P0 connector.

Table 2.2: P0 Connector Pin Assignments, Rows F, E, D

Pin No.	Row F Signal	Row E Signal		Row D Signal	
		Pin-out Modes 1 & 4	Pin-out Mode 2	Pin-out Modes 1 & 4	Pin-out Mode 2
1	GND	CH1DSR	CH1DSR	CH1RXD	CH1RXD
2	GND	PIO(9)	PIO(9)	JTAG_TMS	JTAG_TMS
3	GND	PIO(10)	PIO(10)	CARDFAIL-	CARDFAIL-
4	GND	PMC1_01	CH2RXD	PMC1_02	Reserved
5	GND	PMC1_06	CH3TXD_A	PMC1_07	CH3TXC_A
6	GND	PMC1_11	CH3TXD_B	PMC1_12	CH3TXC_B
7	GND	PMC1_16	CH4RXD_B'	PMC1_17	CH4RXC_B'
8	GND	PMC1_21	CH4RXD_A'	PMC1_22	CH4RXC_A'
9	GND	PIO(7)	PIO(7)	PIO(5)	PIO(5)
10	GND	PIO(8)	PIO(8)	PIO(6)	PIO(6)
11	GND	JTAG_TCK	JTAG_TCK	JTAG_TDI	JTAG_TDI
12	GND	PMC1_26	SD00*	PMC1_27	SD02*
13	GND	PMC1_31	SD01*	PMC1_32	SD03*
14	GND	PMC1_36	GND	PMC1_37	GND
15	GND	PMC1_41	SATN*	PMC1_42	SACK*
16	GND	PMC1_46	SBSY*	PMC1_47	SRST*
17	GND	PMC1_51	GND	PMC1_52	GND
18	GND	PMC1_56	SCD*	PMC1_57	SMSG*
19	GND	PMC1_61	SREQ*	PMC1_62	SSEL*

Note

Signal names of the form PMC1_xx represent the signal on pin xx of the Pn4/Jn4 connector of PMC site 1.

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Table 2.3: P0 Connector Pin Assignments, Rows C, B, A

Pin No.	Row C Signal		Row B Signal		Row A Signal	
	Pin-out Modes 1 & 4	Pin-out Mode 2	Pin-out Modes 1 & 4	Pin-out Mode 2	Pin-out Modes 1 & 4	Pin-out Mode 2
1	CH1TXD	CH1TXD	N/C	ENET_UTP2	N/C	ENET_UTP1
2	GND	GND	N/C	ENET_TXD+	N/C	ENET_TXD-
3	FP_RESET-	FP_RESET-	N/C	ENET_RXD+	N/C	ENET_RXD-
4	PMC1_03	CH2TXD	PMC1_04	Reserved	PMC1_05	Reserved
5	PMC1_08	CH3RXD_A'	PMC1_09	CH3RXC_A'	PMC1_10	Reserved
6	PMC1_13	CH3RXD_B'	PMC1_14	CH3RXC_B'	PMC1_15	Reserved
7	PMC1_18	CH4TXD_B	PMC1_19	CH4TXC_B	PMC1_20	PMC_SMI-
8	PMC1_23	CH4TXD_A	PMC1_24	CH4TXC_A	PMC1_25	PMC_INT-
9	PIO(3)	PIO(3)	PIO(1)	PIO(1)	PIO(0)	PIO(0)
10	PIO(4)	PIO(4)	PIO(2)	PIO(2)	ALT_BOOT-	ALT_BOOT-
11	JTAG_TRST-	JTAG_TRST-	JTAG_TDO	JTAG_TDO	Reserved	Reserved
12	PMC1_28	SD04*	PMC1_29	Reserved	PMC1_30	Reserved
13	PMC1_33	SD05*	PMC1_34	Reserved	PMC1_35	Reserved
14	PMC1_38	GND	PMC1_39	GND	PMC1_40	Reserved
15	PMC1_43	SD06*	PMC1_44	Reserved	PMC1_45	Reserved
16	PMC1_48	SD07*	PMC1_49	Reserved	PMC1_50	Reserved
17	PMC1_53	GND	PMC1_54	GND	PMC1_55	Reserved
18	PMC1_58	SDP1*	PMC1_59	SIO	PMC1_60	Reserved
19	PMC1_63	TERMPWR	PMC1_64	VCC	PIO(11)	PIO(11)

(P0 Row Closest to Backplane)

Note

Signal names of the form PMC1_xx represent the signal on pin xx of the Pn4/Jn4 connector of PMC site 1.

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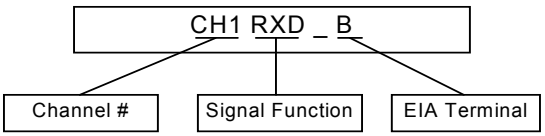
Note

The format used throughout Tables 2.4 through 2.8 for EIA signal names is:



where: A = output terminal, defined as being negative with respect to B for a binary 1.

B = output terminal, with reverse polarity to A.

Input terminals are identified as A' and B', respectively, and again A' is negative with respect to B' for a binary 1.

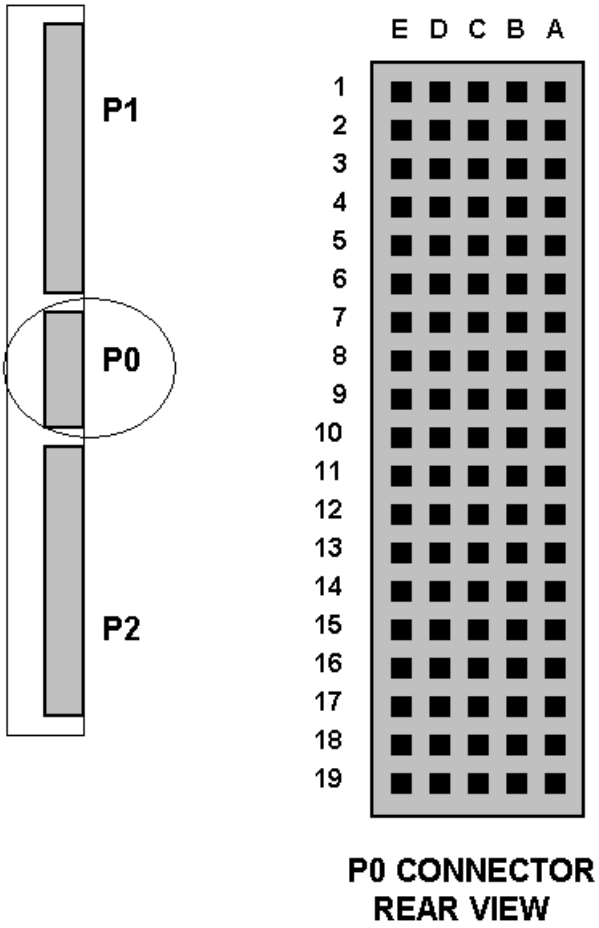


Figure 2.1 P0 Connector

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Electrical Characteristics of P0 Signals

Tables 2.4 to 2.8 provide the electrical characteristics of the basecard P0 signals.

Table 2.4: P0 Connector Description (Row E)

Pin No.	Row E Signal		Dir	Basecard Signal Description	Electrical Characteristics
	Basecard (Mode 2)	(Modes 1 & 4)			
1	CH1DSR	CH1DSR	I	Data Set Ready	EIA-232
2	PIO(9)	PIO(9)	I/O	Discrete Digital I/O bit 9	TTL / LVTTL
3	PIO(10)	PIO(10)	I/O	Discrete Digital I/O bit 10	TTL / LVTTL
4	CH2RXD	PMC1_01	I	Receive Data	EIA-232
5	CH3TXD_A	PMC1_06	O	Transmit Data	EIA-422/485
6	CH3TXD_B	PMC1_11	O	Transmit Data	EIA-422/485
7	CH4RXD_B’	PMC1_16	I	Receive Data	EIA-422/485
8	CH4RXD_A’	PMC1_21	I	Receive Data	EIA-422/485
9	PIO(7)	PIO(7)	I/O	Discrete Digital I/O bit 7	TTL / LVTTL
10	PIO(8)	PIO(8)	I/O	Discrete Digital I/O bit 8	TTL / LVTTL
11	JTAG_TCK	JTAG_TCK	I	JTAG Test Clock	TTL
12	SD00*	PMC1_26	I/O	SCSI Data	SCSI X3.131.1990
13	SD01*	PMC1_31	I/O	SCSI Data	SCSI X3.131.1990
14	GND	PMC1_36	I/O	GND	GND
15	SATN*	PMC1_41	I/O	SCSI Attention	SCSI X3.131.1990
16	SBSY*	PMC1_46	I/O	SCSI Busy	SCSI X3.131.1990
17	GND	PMC1_51	N/A	GND	GND
18	SCD*	PMC1_56	I/O	SCSI Control/Data	SCSI X3.131.1990
19	SREQ*	PMC1_61	I/O	SCSI Request	SCSI X3.131.1990

Note

The electrical characteristics shown in the table above are for the basecard signals only. PMC I/O lines depend on the PMC modules installed, and are beyond the scope of this document.

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Table 2.5: P0 Connector Description (Row D)

Pin No.	Row D Signal		Dir	Basecard Signal Description	Electrical Characteristics
	Basecard (Mode 2)	(Modes 1 & 4)			
1	CH1RXD	CH1RXD	I	Receive Data	EIA-232
2	JTAG_TMS	JTAG_TMS	N/A		N/A
3	CARDFAIL-	CARDFAIL-	O	Card Fail	TTL
4	RESERVED	PMC1_02	N/A	RESERVED	N/A
5	CH3TXC_A	PMC1_07	O	Transmit Clock	EIA-422/485
6	CH3TXC_B	PMC1_12	O	Transmit Clock	EIA-422/485
7	CH4RXC_B'	PMC1_17	I	Receive Clock	EIA-422/485
8	CH4RXC_A'	PMC1_22	I	Receive Clock	EIA-422/485
9	PIO(5)	PIO(5)	I/O	Discrete Digital I/O bit 5	TTL / LVTTL
10	PIO(6)	PIO(6)	I/O	Discrete Digital I/O bit 6	TTL / LVTTL
11	JTAG_TDI	JTAG_TDI	I	JTAG Test Data In	TTL
12	SD02*	PMC1_27	I/O	SCSI Data	SCSI X3.131.1990
13	SD03*	PMC1_32	I/O	SCSI Data	SCSI X3.131.1990
14	GND	PMC1_37	N/A	GND	GND
15	SACK*	PMC1_42	I/O	SCSI Acknowledge	SCSI X3.131.1990
16	SRST*	PMC1_47	I/O	SCSI Reset	SCSI X3.131.1990
17	GND	PMC1_52	N/A	GND	GND
18	SMSG*	PMC1_57	I/O	SCSI Message	SCSI X3.131.1990
19	SSEL*	PMC1_62	I/O	SCSI Select	SCSI X3.131.1990

Note

The electrical characteristics shown in the table above are for the basecard signals only. PMC I/O lines depend on the PMC modules installed, and are beyond the scope of this document.

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Table 2.6: P0 Connector Description (Row C)

Pin No.	Row C Signal		Dir	Basecard Signal Description	Electrical Characteristics
	Basecard (Mode 2)	(Modes 1 & 4)			
1	CH1TXD	CH1TXD	O	Transmit Data	EIA-232
2	GND	GND	N/A	GND	GND
3	FP_RESET-	FP_RESET-	I	Card Reset	TTL
4	CH2TXD	PMC1_03	O	Transmit Data	EIA-232
5	CH3RXD_A’	PMC1_08	I	Receive Data	EIA-422/485
6	CH3RXD_B’	PMC1_13	I	Receive Data	EIA-422/485
7	CH4TXD_B	PMC1_18	O	Transmit Data	EIA-422/485
8	CH4TXD_A	PMC1_23	O	Transmit Data	EIA-422/485
9	PIO(3)	PIO(3)	I/O	Discrete Digital I/O bit 3	TTL / LVTTL
10	PIO(4)	PIO(4)	I/O	Discrete Digital I/O bit 4	TTL / LVTTL
11	JTAG_TRST-	JTAG_TRST-	I	JTAG Reset	TTL
12	SD04*	PMC1_28	I/O	SCSI Data	SCSI X3.131.1990
13	SD05*	PMC1_33	I/O	SCSI Data	SCSI X3.131.1990
14	GND	PMC1_38	N/A	GND	GND
15	SD06*	PMC1_43	I/O	SCSI Data	SCSI X3.131.1990
16	SD07*	PMC1_48	I/O	SCSI Data	GND
17	GND	PMC1_53	N/A	GND	GND
18	SDP1*	PMC1_58	I/O	SCSI Data Parity	SCSI X3.131.1990
19	TERMPWR	PMC1_63	N/A	SCSI Terminator Power	GND

Note

The electrical characteristics shown in the table above are for the basecard signals only. PMC I/O lines depend on the PMC modules installed, and are beyond the scope of this document.

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Table 2.7: P0 Connector Description (Row B)

Pin No.	Row B Signal		Dir	Basecard Signal Description	Electrical Characteristics
	Basecard (Mode 2)	(Modes 1 & 4)			
1	ENET_UTP2	N/C	N/A	Ethernet Unterminated Pair 2	IEEE 802.3
2	ENET_TXD+	N/C	O	Ethernet Transmit	IEEE 802.3
3	ENET_RXD+	N/C	I	Ethernet Receive	IEEE 802.3
4	RESERVED	PMC1_04	N/A	N/A	N/A
5	CH3RXC_A'	PMC1_09	I	Receive Clock	EIA-422/485
6	CH3RXC_B'	PMC1_14	I	Receive Clock	EIA-422/485
7	CH4TXC_B	PMC1_19	O	Transmit Clock	EIA-422/485
8	CH4TXC_A	PMC1_24	O	Transmit Clock	EIA-422/485
9	PIO(1)	PIO(1)	I/O	Discrete Digital I/O bit 1	TTL / LVTTL
10	PIO(2)	PIO(2)	I/O	Discrete Digital I/O bit 2	TTL / LVTTL
11	JTAG_TDO	JTAG_TDO	O	JTAG Test Data Out	TTL
12	RESERVED	PMC1_29	N/A		
13	RESERVED	PMC1_34	N/A		
14	GND	PMC1_39	N/A	GND	GND
15	RESERVED	PMC1_44	N/A		
16	RESERVED	PMC1_49	N/A		
17	GND	PMC1_54	N/A	GND	GND
18	SIO*	PMC1_59	I/O	SCSI Input/Output	SCSI X3.131.1990
19	VCC	PMC1_64	N/A	VCC	+5 V

Note

The electrical characteristics shown in the table above are for the basecard signals only. PMC I/O lines depend on the PMC modules installed, and are beyond the scope of this document.

Also note the SVME/DMV-179 supports an Ethernet interface via the P0 connector on a special order basis. Please contact the factory if you require this option.

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Table 2.8: P0 Connector Description (Row A)

Pin No.	Row A Signal		Dir	Description	Electrical Characteristics
	Basecard (Mode 2)	(Modes 1 & 4)			
1	ENET_UTP1	N/C	N/A	Ethernet Unterminated Pair 1	IEEE 802.3
2	ENET_TXD-	N/C	O	Ethernet Transmit	IEEE 802.3
3	ENET_RXD-	N/C	I	Ethernet Receive	IEEE 802.3
4	RESERVED	PMC1_05	N/A	N/A	N/A
5	RESERVED	PMC1_10	N/A	N/A	N/A
6	RESERVED	PMC1_15	N/A	N/A	N/A
7	PMC_SMI-	PMC1_20	O	SMI Output	LVTTL
8	PMC_INT-	PMC1_25	O	INT Output	LVTTL
9	PIO(0)	PIO(0)	I/O	Discrete Digital I/O bit 0	TTL / LVTTL
10	ALT_BOOT-	ALT_BOOT-	I	Alternate boot enable.	TTL
11	RESERVED	N/C	N/A	N/A	N/A
12	RESERVED	PMC1_30	N/A	N/A	N/A
13	RESERVED	PMC1_35	N/A	N/A	N/A
14	RESERVED	PMC1_40	N/A	N/A	N/A
15	RESERVED	PMC1_45	N/A	N/A	N/A
16	RESERVED	PMC1_50	N/A	N/A	N/A
17	RESERVED	PMC1_55	N/A	N/A	N/A
18	RESERVED	PMC1_60	N/A	N/A	N/A
19	PIO(11)	PIO(11)	I/O	Discrete Digital I/O bit 11	TTL / LVTTL

Note

The electrical characteristics shown in the table above are for the basecard signals only. PMC I/O lines depend on the PMC modules installed, and are beyond the scope of this document.

Also note the SVME/DMV-179 supports an Ethernet interface via the P0 connector on a special order basis. Please contact the factory if you require this option.

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P1 Connector Pin Assignments

The P1 connector is a 5-row type DIN 41612, with pin assignments in accordance with the IEEE 1014-1987 VMEbus specification. See Table 2.9 for the connector pin assignments.

Table 2.9: P1 Connector Pin Assignments

Pin Number	Row Z Signal	Row A Signal	Row B Signal	Row C Signal	Row D Signal
1	RESERVED	D00	BBSY*	D08	+5V
2	GND	D01	BCLR*	D09	GND
3	RESERVED	D02	ACFAIL*	D10	RESERVED
4	GND	D03	BG0IN*	D11	RESERVED
5	RESERVED	D04	BG0OUT*	D12	RESERVED
6	GND	D05	BG1IN*	D13	RESERVED
7	RESERVED	D06	BG1OUT*	D14	RESERVED
8	GND	D07	BG2IN*	D15	RESERVED
9	RESERVED	GND	BG2OUT*	GND	GAP*
10	GND	SYSCLK	BG3IN*	SYSFAIL*	GA0*
11	RESERVED	GND	BG3OUT*	BERR*	GA1*
12	GND	DS1*	BR0*	SYSRESET*	+3.3V
13	RESERVED	DS0*	BR1*	LWORD*	GA2*
14	GND	WRITE*	BR2*	AM5	+3.3V
15	RESERVED	GND	BR3*	A23	GA3*
16	GND	DTACK*	AM0	A22	+3.3V
17	RESERVED	GND	AM1	A21	GA4*
18	GND	AS*	AM2	A20	+3.3V
19	RESERVED	GND	AM3	A19	RESERVED
20	GND	IACK*	GND	A18	+3.3V
21	RESERVED	IACKIN*	SERCLK (1)	A17	RESERVED
22	GND	IACKOUT*	SERDAT* (1)	A16	+3.3V
23	RESERVED	AM4	GND	A15	RESERVED
24	GND	A07	IRQ7*	A14	+3.3V
25	RESERVED	A06	IRQ6*	A13	RESERVED
26	GND	A05	IRQ5*	A12	+3.3V
27	RESERVED	A04	IRQ4*	A11	RESERVED
28	GND	A03	IRQ3*	A10	+3.3V
29	RESERVED	A02	IRQ2*	A09	RESERVED
30	GND	A01	IRQ1*	A08	+3.3V
31	RESERVED	-12V	+5V STBY	+12V	GND
32	GND	+5V	+5V	+5V	+5V

(1) - not supported

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Table 2.10: P1 Connector Description (Row Z)

Pin No.	Row Z	Dir	Description	Electrical Characteristics
1	RESERVED	N/A	RESERVED	N/A
2	GND	N/A	GND	GND
3	RESERVED	N/A	RESERVED	N/A
4	GND	N/A	GND	GND
5	RESERVED	N/A	RESERVED	N/A
6	GND	N/A	GND	GND
7	RESERVED	N/A	RESERVED	N/A
8	GND	N/A	GND	GND
9	RESERVED	N/A	RESERVED	N/A
10	GND	N/A	GND	GND
11	RESERVED	N/A	RESERVED	N/A
12	GND	N/A	GND	GND
13	RESERVED	N/A	RESERVED	N/A
14	GND	N/A	GND	GND
15	RESERVED	N/A	RESERVED	N/A
16	GND	N/A	GND	GND
17	RESERVED	N/A	RESERVED	N/A
18	GND	N/A	GND	GND
19	RESERVED	N/A	RESERVED	N/A
20	GND	N/A	GND	GND
21	RESERVED	N/A	RESERVED	N/A
22	GND	N/A	GND	GND
23	RESERVED	N/A	RESERVED	N/A
24	GND	N/A	GND	GND
25	RESERVED	N/A	RESERVED	N/A
26	GND	N/A	GND	GND
27	RESERVED	N/A	RESERVED	N/A
28	GND	N/A	GND	GND
29	RESERVED	N/A	RESERVED	N/A
30	GND	N/A	GND	GND
31	RESERVED	N/A	RESERVED	N/A
32	GND	N/A	GND	GND

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Table 2.11: P1 Connector Description (Row A)

Pin No.	Row A Signal	Dir	Description	Electrical Characteristics
1	D00	I/O	Data	ANSI/VITA 1-1996
2	D01	I/O	Data	ANSI/VITA 1-1996
3	D02	I/O	Data	ANSI/VITA 1-1996
4	D03	I/O	Data	ANSI/VITA 1-1996
5	D04	I/O	Data	ANSI/VITA 1-1996
6	D05	I/O	Data	ANSI/VITA 1-1996
7	D06	I/O	Data	ANSI/VITA 1-1996
8	D07	I/O	Data	ANSI/VITA 1-1996
9	GND	N/A	GND	GND
10	SYSCLK	I/O	System Clock	ANSI/VITA 1-1996
11	GND	N/A	GND	GND
12	DS1*	I/O	Data Strobe	ANSI/VITA 1-1996
13	DS0*	I/O	Data Strobe	ANSI/VITA 1-1996
14	WRITE*	I/O	Write Signal	ANSI/VITA 1-1996
15	GND	N/A	GND	GND
16	DTACK*	I/O	Data Transfer Acknowledge	ANSI/VITA 1-1996
17	GND	N/A	GND	GND
18	AS*	I/O	Address Strobe	ANSI/VITA 1-1996
19	GND	N/A	GND	GND
20	IACK*	I/O	Interrupt Acknowledge	ANSI/VITA 1-1996
21	IACKIN*	I	Interrupt Acknowledge In	ANSI/VITA 1-1996
22	IACKOUT*	O	Interrupt Acknowledge Out	ANSI/VITA 1-1996
23	AM4	I/O	Address Modifier Code	ANSI/VITA 1-1996
24	A07	I/O	Address	ANSI/VITA 1-1996
25	A06	I/O	Address	ANSI/VITA 1-1996
26	A05	I/O	Address	ANSI/VITA 1-1996
27	A04	I/O	Address	ANSI/VITA 1-1996
28	A03	I/O	Address	ANSI/VITA 1-1996
29	A02	I/O	Address	ANSI/VITA 1-1996
30	A01	I/O	Address	ANSI/VITA 1-1996
31	-12V	N/A	-12 V Supply	-12 V
32	+5V	N/A	Positive Supply	+5 V

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Table 2.12: P1 Connector Description (Row B)

Pin No.	Row B Signal	Dir	Description	Electrical Characteristics
1	BBSY*	I/O	Bus Busy	ANSI/VITA 1-1996
2	BCLR*	O	Bus Clear	ANSI/VITA 1-1996
3	ACFAIL*	I	AC Fail	ANSI/VITA 1-1996
4	BG0IN*	I	Bus Grant In	ANSI/VITA 1-1996
5	BG0OUT*	O	Bus Grant Out	ANSI/VITA 1-1996
6	BG1IN*	I	Bus Grant In	ANSI/VITA 1-1996
7	BG1OUT*	O	Bus Grant Out	ANSI/VITA 1-1996
8	BG2IN*	I	Bus Grant In	ANSI/VITA 1-1996
9	BG2OUT*	O	Bus Grant Out	ANSI/VITA 1-1996
10	BG3IN*	I	Bus Grant In	ANSI/VITA 1-1996
11	BG3OUT*	O	Bus Grant Out	ANSI/VITA 1-1996
12	BR0*	O	Bus Request	ANSI/VITA 1-1996
13	BR1*	O	Bus Request	ANSI/VITA 1-1996
14	BR2*	O	Bus Request	ANSI/VITA 1-1996
15	BR3*	O	Bus Request	ANSI/VITA 1-1996
16	AM0	I/O	Address Modifier Code	ANSI/VITA 1-1996
17	AM1	I/O	Address Modifier Code	ANSI/VITA 1-1996
18	AM2	I/O	Address Modifier Code	ANSI/VITA 1-1996
19	AM3	I/O	Address Modifier Code	ANSI/VITA 1-1996
20	GND	N/A	GND	GND
21	SERCLK	N/A	Not Supported on SVME/DMV-179	ANSI/VITA 1-1996
22	SERDAT*	N/A	Not Supported on SVME/DMV-179	ANSI/VITA 1-1996
23	GND	N/A	GND	GND
24	IRQ7*	I/O	Interrupt Request	ANSI/VITA 1-1996
25	IRQ6*	I/O	Interrupt Request	ANSI/VITA 1-1996
26	IRQ5*	I/O	Interrupt Request	ANSI/VITA 1-1996
27	IRQ4*	I/O	Interrupt Request	ANSI/VITA 1-1996
28	IRQ3*	I/O	Interrupt Request	ANSI/VITA 1-1996
29	IRQ2*	I/O	Interrupt Request	ANSI/VITA 1-1996
30	IRQ1*	I/O	Interrupt Request	ANSI/VITA 1-1996
31	+5V STBY	N/A	Standby Positive Supply	+5 V
32	+5V	N/A	Positive Supply	+5 V

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Table 2.13: P1 Connector Description (Row C)

Pin No.	Row C Signal	Dir	Description	Electrical Characteristics
1	D08	I/O	Data	ANSI/VITA 1-1996
2	D09	I/O	Data	ANSI/VITA 1-1996
3	D10	I/O	Data	ANSI/VITA 1-1996
4	D11	I/O	Data	ANSI/VITA 1-1996
5	D12	I/O	Data	ANSI/VITA 1-1996
6	D13	I/O	Data	ANSI/VITA 1-1996
7	D14	I/O	Data	ANSI/VITA 1-1996
8	D15	I/O	Data	ANSI/VITA 1-1996
9	GND	N/A	GND	GND
10	SYSFAIL*	I/O	System Fail	ANSI/VITA 1-1996
11	BERR*	I/O	Bus Error	ANSI/VITA 1-1996
12	SYSRESET*	I/O	System Reset	ANSI/VITA 1-1996
13	LWORD*	I/O	Longword Data Transfer Indicator	ANSI/VITA 1-1996
14	AM5	I/O	Address Modifier Code	ANSI/VITA 1-1996
15	A23	I/O	Address	ANSI/VITA 1-1996
16	A22	I/O	Address	ANSI/VITA 1-1996
17	A21	I/O	Address	ANSI/VITA 1-1996
18	A20	I/O	Address	ANSI/VITA 1-1996
19	A19	I/O	Address	ANSI/VITA 1-1996
20	A18	I/O	Address	ANSI/VITA 1-1996
21	A17	I/O	Address	ANSI/VITA 1-1996
22	A16	I/O	Address	ANSI/VITA 1-1996
23	A15	I/O	Address	ANSI/VITA 1-1996
24	A14	I/O	Address	ANSI/VITA 1-1996
25	A13	I/O	Address	ANSI/VITA 1-1996
26	A12	I/O	Address	ANSI/VITA 1-1996
27	A11	I/O	Address	ANSI/VITA 1-1996
28	A10	I/O	Address	ANSI/VITA 1-1996
29	A09	I/O	Address	ANSI/VITA 1-1996
30	A08	I/O	Address	ANSI/VITA 1-1996
31	+12V	N/A	+12 V Supply	+12 V
32	+5V	N/A	Positive Supply	+5 V

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Table 2.14: P1 Connector Description (Row D)

Pin No.	Row D Signal	Dir	Description	Electrical Characteristics
1	+5V	N/A	Positive Supply	+5 V
2	GND	N/A	GND	GND
3	RESERVED	N/A	RESERVED	N/A
4	RESERVED	N/A	RESERVED	N/A
5	RESERVED	N/A	RESERVED	N/A
6	RESERVED	N/A	RESERVED	N/A
7	RESERVED	N/A	RESERVED	N/A
8	RESERVED	N/A	RESERVED	N/A
9	GAP*	I	Geographical Address Parity	GND or pull-up to 5V
10	GA0*	I	Geographical Address Bit 0	GND or pull-up to 5V
11	GA1*	I	Geographical Address Bit 1	GND or pull-up to 5V
12	+3.3V	N/A	+3.3 V Supply for PMC modules	+3.3 V
13	GA2*	I	Geographical Address Bit 2	GND or pull-up to 5V
14	+3.3V	N/A	+3.3 V Supply for PMC modules	+3.3 V
15	GA3*	I	Geographical Address Bit 3	GND or pull-up to 5V
16	+3.3V	N/A	+3.3 V Supply for PMC modules	+3.3 V
17	GA4*	I	Geographical Address Bit 4	GND or pull-up to 5V
18	+3.3V	N/A	+3.3 V Supply for PMC modules	+3.3 V
19	RESERVED	N/A	RESERVED	N/A
20	+3.3V	N/A	+3.3 V Supply for PMC modules	+3.3 V
21	RESERVED	N/A	RESERVED	N/A
22	+3.3V	N/A	+3.3 V Supply for PMC modules	+3.3 V
23	RESERVED	N/A	RESERVED	N/A
24	+3.3V	N/A	+3.3 V Supply for PMC modules	+3.3 V
25	RESERVED	N/A	RESERVED	N/A
26	+3.3V	N/A	+3.3 V Supply for PMC modules	+3.3 V
27	RESERVED	N/A	RESERVED	N/A
28	+3.3V	N/A	+3.3V Supply for PMC modules	+3.3V
29	RESERVED	N/A	RESERVED	N/A
30	+3.3V	N/A	+3.3V Supply for PMC modules	+3.3V
31	GND	N/A	GND	GND
32	+5V	N/A	Positive Supply	+5 V

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P2 Connector Pin Assignments

Table 2.15 lists the pin assignments for the SVME/DMV-179 basecard. Figure 2.2 on page 2-20 shows the location of the contacts on the P2 connector.

Table 2.15: P2 Connector Pin Assignments

Pin	Row A		Row B	Row C		Row D		Row Z
	Modes 1, 2, 4	Mode 3		Modes 1, 2, 4	Mode 3	Modes 1, 2, 3	Mode 4	
1	PMC2_02	SD00*	+5V	PMC2_01	SATN*	SATN*	SATN*	SD00*
2	PMC2_04	SD01*	GND	PMC2_03	SBSY*	SBSY*	SBSY*	GND
3	PMC2_06	SD02*	Reserved	PMC2_05	SACK*	SACK*	SACK*	SD01*
4	PMC2_08	SD03*	A24	PMC2_07	SRST*	SRST*	SRST*	GND
5	PMC2_10	SD04*	A25	PMC2_09	SMSG*	SMSG*	SMSG*	SD02*
6	PMC2_12	SD05*	A26	PMC2_11	SSEL*	SSEL*	SSEL*	GND
7	PMC2_14	SD06*	A27	PMC2_13	SCD*	SCD*	SCD*	SD03*
8	PMC2_16	SD07*	A28	PMC2_15	SREQ*	SREQ*	SREQ*	GND
9	PMC2_18	SDP1*	A29	PMC2_17	SIO*	SIO*	SIO*	SD04*
10	PMC2_20	ENET_UTP1	A30	PMC2_19	TERMPWR	TERMPWR	TERMPWR	GND
11	PMC2_22	CH3TXD_A	A31	PMC2_21	N/C	CH3TXD_A	CH3TXD_A	SD05*
12	PMC2_24	CH3TXD_B	GND	PMC2_23	N/C	CH3TXD_B	CH3TXD_B	GND
13	PMC2_26	CH3RXD_A'	+5V	PMC2_25	N/C	CH3RXD_B'	CH3RXD_B'	SD06*
14	PMC2_28	CH3RXD_B'	D16	PMC2_27	N/C	CH3RXD_A'	CH3RXD_A'	GND
15	PMC2_30	CH3TXC_A	D17	PMC2_29	N/C	CH3TXC_A	CH3TXC_A	SD07*
16	PMC2_32	CH3TXC_B	D18	PMC2_31	N/C	CH3TXC_B	SDP2*	GND
17	PMC2_34	N/C	D19	PMC2_33	N/C	CH1TXD	CH1TXD	SDP1*
18	PMC2_36	N/C	D20	PMC2_35	N/C	CH1RXD	CH1RXD	GND
19	PMC2_38	N/C	D21	PMC2_37	N/C	CH1DSR	CH1DSR	CH2RXD
20	PMC2_40	N/C	D22	PMC2_39	CH4RXD_A'	CH4RXD_B'	SD08	GND
21	PMC2_42	CH1TXD	D23	PMC2_41	CH4RXD_B'	CH4RXD_A'	SD09	CH3RXC_A'
22	PMC2_44	CH2RXD	GND	PMC2_43	CH4TXC_A	CH4TXC_A	SD10	GND
23	PMC2_46	CH3RXC_A'	D24	PMC2_45	CH4TXC_B	CH4TXC_B	SD11	CH3RXC_B'
24	PMC2_48	CH3RXC_B'	D25	PMC2_47	CH4RXC_A'	CH4RXC_B'	SD12	GND
25	PMC2_50	N/C	D26	PMC2_49	CH4RXC_B'	CH4RXC_A'	SD13	ENET_TXD+
26	PMC2_52	N/C	D27	PMC2_51	CH4TXD_A	CH4TXD_A	SD14	GND
27	PMC2_54	N/C	D28	PMC2_53	CH4TXD_B	CH4TXD_B	SD15	ENET_TXD-
28	PMC2_56	CH2TXD	D29	PMC2_55	ENET_RXD+	ENET_UTP1	ENET_UTP1	GND
29	PMC2_58	CH1RXD	D30	PMC2_57	CARDFAIL-	ENET_UTP2	ENET_UTP2	ENET_RXD+
30	PMC2_60	CH1DSR	D31	PMC2_59	ENET_RXD-	CH2TXD	CH2TXD	GND
31	PMC2_62	N/C	GND	PMC2_61	ENET_TXD+	GND	GND	ENET_RXD-
32	PMC2_64	ENET_UTP2	+5V	PMC2_63	ENET_TXD-	VCC	VCC	GND

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Note

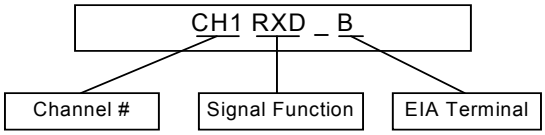
If the basecard is configured to accept a PMC module in site #2, then the basecard signals on rows A and C are unavailable. Refer to your *Product Release Note* for details on the configuration of your card.

Note

Signal names of the form PMC2_xx represent the signal on pin xx of the Pn4/ Jn4 connector of PMC site 2.

Note

The format used throughout Tables 2.15 through 2.20 for EIA signal names is:



where: A = output terminal, defined as being negative with respect to B for a binary 1.

B = output terminal, with reverse polarity to A.

Input terminals are identified as A' and B', respectively, and again A' is negative with respect to B' for a binary 1.

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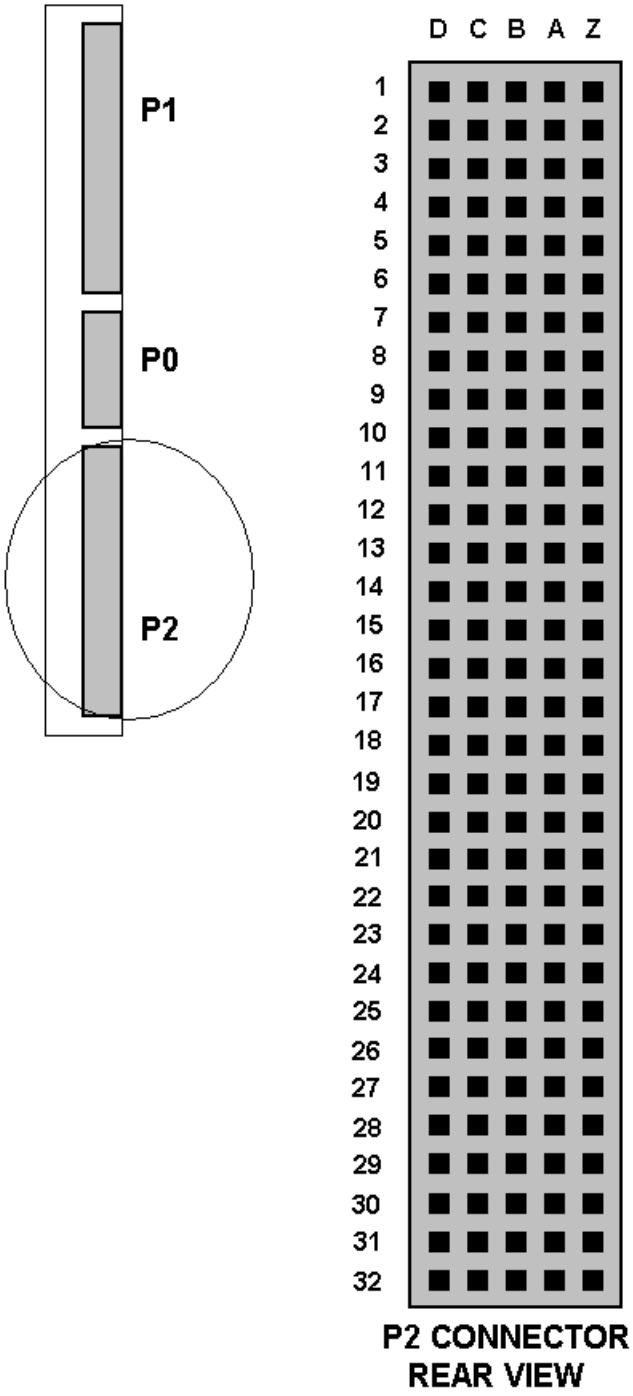

Figure 2.2 P2 Connector

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Table 2.16: P2 Connector Data (Row A)

Pin #	Signal Name		Dir	Description	Electrical Characteristics
	Basecard I/O (Mode 3)	PMC I/O (Modes 1, 2, 4)			
1	SD00*	PMC2_02	I/O	SCSI Data	SCSI X3.131.1990
2	SD01*	PMC2_04	I/O	SCSI Data	SCSI X3.131.1990
3	SD02*	PMC2_06	I/O	SCSI Data	SCSI X3.131.1990
4	SD03*	PMC2_08	I/O	SCSI Data	SCSI X3.131.1990
5	SD04*	PMC2_10	I/O	SCSI Data	SCSI X3.131.1990
6	SD05*	PMC2_12	I/O	SCSI Data	SCSI X3.131.1990
7	SD06*	PMC2_14	I/O	SCSI Data	SCSI X3.131.1990
8	SD07*	PMC2_16	I/O	SCSI Data	SCSI X3.131.1990
9	SDP1*	PMC2_18	I/O	SCSI Data Parity	SCSI X3.131.1990
10	ENET_UTP1	PMC2_20	N/A	Ethernet Unterminated Pair 1	IEEE 802.3
11	CH3TXD_A	PMC2_22	O	Transmit Data	EIA-422/485
12	CH3TXD_B	PMC2_24	O	Transmit Data	EIA-422/485
13	CH3RXD_A’	PMC2_26	I	Receive Data	EIA-422/485
14	CH3RXD_B’	PMC2_28	I	Receive Data	EIA-422/485
15	CH3TXC_A	PMC2_30	O	Transmit Clock	EIA-422/485
16	CH3TXC_B	PMC2_32	O	Transmit Clock	EIA-422/485
17	N/C	PMC2_34			
18	N/C	PMC2_36			
19	N/C	PMC2_38			
20	N/C	PMC2_40			
21	CH1TXD	PMC2_42	O	Transmit Data	EIA-232
22	CH2RXD	PMC2_44	I	Receive Data	EIA-232
23	CH3RXC_A’	PMC2_46	I	Receive Clock	EIA-422/485
24	CH3RXC_B’	PMC2_48	I	Receive Clock	EIA-422/485
25	N/C	PMC2_50			
26	N/C	PMC2_52			
27	N/C	PMC2_54			
28	CH2TXD	PMC2_56	O	Transmit Data	EIA-232
29	CH1RXD	PMC2_58	I	Receive Data	EIA-232
30	CH1DSR	PMC2_60	I	Data Set Ready	EIA-232
31	Reserved	PMC2_62			
32	ENET_UTP2	PMC2_64	N/A	Ethernet Unterminated Pair 2	IEEE 802.3

Note

The electrical characteristics shown in the table above are for basecard signals only. PMC I/O lines depend on the PMC modules installed and are beyond the scope of this document.

Signal names of the form PMC2_xx represent the signal on pin xx of the Pn4/ Jn4 connector of PMC site 2.

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Table 2.17: P2 Connector Data (Row B)

Pin #	Signal Name	Dir	Description	Electrical Characteristics
1	+5V	N/A	Positive Supply	+ 5V
2	GND	N/A	GROUND	GND
3	RESERVED	N/A	RESERVED	N/A
4	A24	I/O	Address	ANSI/VITA 1-1996
5	A25	I/O	Address	ANSI/VITA 1-1996
6	A26	I/O	Address	ANSI/VITA 1-1996
7	A27	I/O	Address	ANSI/VITA 1-1996
8	A28	I/O	Address	ANSI/VITA 1-1996
9	A29	I/O	Address	ANSI/VITA 1-1996
10	A30	I/O	Address	ANSI/VITA 1-1996
11	A31	I/O	Address	ANSI/VITA 1-1996
12	GND	N/A	GROUND	GND
13	+5V	N/A	Positive Supply	+ 5V
14	D16	I/O	Data	ANSI/VITA 1-1996
15	D17	I/O	Data	ANSI/VITA 1-1996
16	D18	I/O	Data	ANSI/VITA 1-1996
17	D19	I/O	Data	ANSI/VITA 1-1996
18	D20	I/O	Data	ANSI/VITA 1-1996
19	D21	I/O	Data	ANSI/VITA 1-1996
20	D22	I/O	Data	ANSI/VITA 1-1996
21	D23	I/O	Data	ANSI/VITA 1-1996
22	GND	N/A	GROUND	GND
23	D24	I/O	Data	ANSI/VITA 1-1996
24	D25	I/O	Data	ANSI/VITA 1-1996
25	D26	I/O	Data	ANSI/VITA 1-1996
26	D27	I/O	Data	ANSI/VITA 1-1996
27	D28	I/O	Data	ANSI/VITA 1-1996
28	D29	I/O	Data	ANSI/VITA 1-1996
29	D30	I/O	Data	ANSI/VITA 1-1996
30	D31	I/O	Data	ANSI/VITA 1-1996
31	GND	N/A	GROUND	GND
32	+5V	N/A	Positive Supply	+ 5V

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Table 2.18: P2 Connector Data (Row C)

Pin #	Signal Name		Dir	Description	Electrical Characteristics
	Basecard I/O (Mode 3)	PMC I/O (Modes 1, 2, 4)			
1	SATN*	PMC2_01	I/O	SCSI Attention	SCSI X3.131.1990
2	SBSY*	PMC2_03	I/O	SCSI Busy	SCSI X3.131.1990
3	SACK*	PMC2_05	I/O	SCSI Acknowledge	SCSI X3.131.1990
4	SRST*	PMC2_07	I/O	SCSI Reset	SCSI X3.131.1990
5	SMSG*	PMC2_09	I/O	SCSI Message	SCSI X3.131.1990
6	SSEL*	PMC2_11	I/O	SCSI Select	SCSI X3.131.1990
7	SCD*	PMC2_13	I/O	SCSI Control/Data	SCSI X3.131.1990
8	SREQ*	PMC2_15	I/O	SCSI Request	SCSI X3.131.1990
9	SIO*	PMC2_17	I/O	SCSI Input/Output	SCSI X3.131.1990
10	TERMPWR	PMC2_19	N/A	SCSI Terminator	SCSI X3.131.1990
11	N/C	PMC2_21			
12	N/C	PMC2_23			
13	N/C	PMC2_25			
14	N/C	PMC2_27			
15	N/C	PMC2_29			
16	N/C	PMC2_31			
17	N/C	PMC2_33			
18	N/C	PMC2_35			
19	N/C	PMC2_37			
20	CH4RXD_A’	PMC2_39	I	Receive Data	EIA-422/485
21	CH4RXD_B’	PMC2_41	I	Receive Data	EIA-422/485
22	CH4TXC_A	PMC2_43	O	Transmit Clock	EIA-422/485
23	CH4TXC_B	PMC2_45	O	Transmit Clock	EIA-422/485
24	CH4RXC_A’	PMC2_47	I	Receive Clock	EIA-422/485
25	CH4RXC_B’	PMC2_49	I	Receive Clock	EIA-422/485
26	CH4TXD_A	PMC2_51	O	Transmit Data	EIA-422/485
27	CH4TXD_B	PMC2_53	O	Transmit Data	EIA-422/485
28	ENET_RXD+	PMC2_55	I	Ethernet Receive Data	IEEE 802.3
29	CARDFAIL-	PMC2_57	O	CardFail	TTL
30	ENET_RXD-	PMC2_59	I	Ethernet Receive Data	IEEE 802.3
31	ENET_TXD+	PMC2_61	O	Ethernet Transmit Data	IEEE 802.3
32	ENET_TXD-	PMC2_63	O	Ethernet Transmit Data	IEEE 802.3

Note

The electrical characteristics shown in the table above are for basecard signals only. PMC I/O lines depend on the PMC modules installed and are beyond the scope of this document.

Signal names of the form PMC2_xx represent the signal on pin xx of the Pn4/Jn4 connector of PMC site 2.

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Table 2.19: P2 Connector Data (Row D)

Pin	8-bit SCSI (Modes 1, 2, 3)				16-bit SCSI (Mode 4)			
	Signal	Dir	Description	Electrical Characteristics	Signal	Dir	Description	Electrical Characteristics
1	SATN*	I/O	SCSI Attention	SCSI X3.131.1990	SATN*	I/O	SCSI Attention	SCSI X3.131.1990
2	SBSY*	I/O	SCSI Busy	SCSI X3.131.1990	SBSY*	I/O	SCSI Busy	SCSI X3.131.1990
3	SACK*	I/O	SCSI Acknowl-edge	SCSI X3.131.1990	SACK*	I/O	SCSI Acknowl-edge	SCSI X3.131.1990
4	SRST*	I/O	SCSI Reset	SCSI X3.131.1990	SRST*	I/O	SCSI Reset	SCSI X3.131.1990
5	SMSG*	I/O	SCSI Message	SCSI X3.131.1990	SMSG*	I/O	SCSI Message	SCSI X3.131.1990
6	SSEL*	I/O	SCSI Select	SCSI X3.131.1990	SSEL*	I/O	SCSI Select	SCSI X3.131.1990
7	SCD*	I/O	SCSI Control/Data	SCSI X3.131.1990	SCD*	I/O	SCSI Control/Data	SCSI X3.131.1990
8	SREQ*	I/O	SCSI Request	SCSI X3.131.1990	SREQ*	I/O	SCSI Request	SCSI X3.131.1990
9	SIO*	I/O	SCSI Input/Output	SCSI X3.131.1990	SIO*	I/O	SCSI Input/Output	SCSI X3.131.1990
10	TERMPWR	N/A	SCSI Terminator Pwr	SCSI X3.131.1990	TERMPWR	N/A	SCSI Terminator Power	SCSI X3.131.1990
11	CH3TXD_A	O	Transmit Data	EIA-422/485	CH3TXD_A	O	Transmit Data	EIA-422/485
12	CH3TXD_B	O	Transmit Data	EIA-422/485	CH3TXD_B	O	Transmit Data	EIA-422/485
13	CH3RXD_B'	I	Receive Data	EIA-422/485	CH3RXD_B'	I	Receive Data	EIA-422/485
14	CH3RXD_A'	I	Receive Data	EIA-422/485	CH3RXD_A'	I	Receive Data	EIA-422/485
15	CH3TXC_A	O	Transmit Clock	EIA-422/485	CH3TXC_A	O	Transmit Clock	EIA-422/485
16	CH3TXC_B	O	Transmit Clock	EIA-422/485	SDP2*	I/O	SCSI Data Parity	SCSI X3.131.1990
17	CH1TXD	O	Transmit Data	EIA-232	CH1TXD	O	Transmit Data	EIA-232
18	CH1RXD	I	Receive Data	EIA-232	CH1RXD	I	Receive Data	EIA-232
19	CH1DSR	I	Data Set Ready	EIA-232	CH1DSR	I	Data Set Ready	EIA-232
20	CH4RXD_B'	I	Receive Data	EIA-422/485	SD08*	I/O	SCSI Data	SCSI X3.131.1990
21	CH4RXD_A'	I	Receive Data	EIA-422/485	SD09*	I/O	SCSI Data	SCSI X3.131.1990
22	CH4TXC_A	O	Transmit Clock	EIA-422/485	SD10*	I/O	SCSI Data	SCSI X3.131.1990
23	CH4TXC_B	O	Transmit Clock	EIA-422/485	SD11*	I/O	SCSI Data	SCSI X3.131.1990
24	CH4RXC_B'	I	Receive Clock	EIA-422/485	SD12*	I/O	SCSI Data	SCSI X3.131.1990
25	CH4RXC_A'	I	Receive Clock	EIA-422/485	SD13*	I/O	SCSI Data	SCSI X3.131.1990
26	CH4TXD_A	O	Transmit Data	EIA-422/485	SD14*	I/O	SCSI Data	SCSI X3.131.1990
27	CH4TXD_B	O	Transmit Data	EIA-422/485	SD15*	I/O	SCSI Data	SCSI X3.131.1990
28	ENET_UTP1	N/A	Enet Unterm. Pair	IEEE 802.3	ENET_UTP1	N/A	Enet Unterm. Pair	IEEE 802.3
29	ENET_UTP2	N/A	Enet Unterm. Pair	IEEE 802.3	ENET_UTP2	N/A	Enet Unterm. Pair	IEEE 802.3
30	CH2TXD	O	Transmit Data	EIA-232	CH2TXD	O	Transmit Data	EIA-232
31	GND	N/A	GND	GND	GND	N/A	GND	GND
32	VCC	N/A	Positive Supply	+5 V	VCC	N/A	Positive Supply	+5 V

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Table 2.20: P2 Connector Data (Row Z)

Pin #	Signal Name	Dir	Description	Electrical Characteristics
1	SD00*	I/O	SCSI Data	SCSI X3.131.1990
2	GND	N/A	GND	GND
3	SD01*	I/O	SCSI Data	SCSI X3.131.1990
4	GND	N/A	GND	GND
5	SD02*	I/O	SCSI Data	SCSI X3.131.1990
6	GND	N/A	GND	GND
7	SD03*	I/O	SCSI Data	SCSI X3.131.1990
8	GND	N/A	GND	GND
9	SD04*	I/O	SCSI Data	SCSI X3.131.1990
10	GND	N/A	GND	GND
11	SD05*	I/O	SCSI Data	SCSI X3.131.1990
12	GND	N/A	GND	GND
13	SD06*	I/O	SCSI Data	SCSI X3.131.1990
14	GND	N/A	GND	GND
15	SD07*	I/O	SCSI Data	SCSI X3.131.1990
16	GND	N/A	GND	GND
17	SDP1*	I/O	SCSI Data Parity	SCSI X3.131.1990
18	GND	N/A	GND	GND
19	CH2RXD	I	Receive Data	EIA-232
20	GND	N/A	GND	GND
21	CH3RXC_A’	I	Receive Clock	EIA-422/485
22	GND	N/A	GND	GND
23	CH3RXC_B’	I	Receive Clock	EIA-422/485
24	GND	N/A	GND	GND
25	ENET_TXD+	O	Ethernet Transmit	IEEE 802.3
26	GND	N/A	GND	GND
27	ENET_TXD-	O	Ethernet Transmit	IEEE 802.3
28	GND	N/A	GND	GND
29	ENET_RXD+	I	Ethernet Receive	IEEE 802.3
30	GND	N/A	GND	GND
31	ENET_RXD-	I	Ethernet Receive	IEEE 802.3
32	GND	N/A	GND	GND

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J9 Front Panel Connector

Table 2.21: J9 Connector Description

Pin #	Signal Name	Dir	Description	Electrical Characteristics
1	COPS_TDI	I	CPU JTAG Test Data In	TTL
2	COPS_TMS	I	CPU JTAG Mode	TTL
3	COPS_TCK	I	CPU JTAG CLK	TTL
4	COPS_CKSTP	O	CPU Checkstop	TTL
5	COPS_SRST	I	COP Soft Reset	TTL
6	COPS_JTRST	I	COP JTAG Reset	TTL
7	COPS_HRST	I	COP Hard Reset	TTL
8	GND		Ground	Ground
9	CH2RTS	O	CH2 Request To Send	EIA-232
10	CH2CTS	I	CH2 Clear To Send	EIA-232
11	CH2RXD	I	CH2 Receive Data	EIA-232
12	CH2TXD	O	CH2 Transmit Data	EIA-232
13	CH1DSR	I	CH1 Data Set Ready	EIA-232
14	CH1RXD	I	CH1 Receive Data	EIA-232
15	CH1DCD	I	CH1 Data Carrier Detect	EIA-232
16	CH1TXD	O	CH1 Transmit Data	EIA-232
17	ENET_RXD-	I	Ethernet Receive Data -	IEEE 802.3
18	ENET_RXD+	I	Ethernet Receive Data +	IEEE 802.3
19	ENET_TXD+	O	Ethernet Transmit Data +	IEEE 802.3
20	ENET_TXD-	O	Ethernet Transmit data -	IEEE 802.3
21	ENET_UTP2	N/A	Ethernet Unterminated Pair 2	IEEE 802.3
22	ENET_UTP1	N/A	Ethernet Unterminated Pair 1	IEEE 802.3
23	CPU_QACK-	I	JTAG Quiescent Acknowledge	TTL
24	FP_RESET	I	Front Panel / Card Only Reset	TTL
25	Not Used	O		
26	GND	N/A	Ground	Ground
27	GND	N/A	Ground	Ground
28	GND	O	Ground	Ground
29	COPS_PWR	I	+3.3V	
30	Not Used	I		
31	COPS_TDO	O	CPU JTAG Test Data Out	TTL

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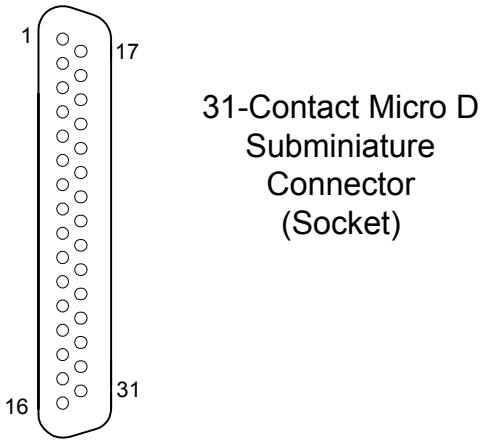

Figure 2.3 J9 Contact Numbering Arrangement (Looking into the Front Panel)

PMC Connectors

The SVME/DMV-179 PMC connectors are described in the following sections.

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J1 Connector

Table 2.22 lists the pin assignments for the connector referenced J1. This connector is part of PMC site #2, and is referenced as Pn3/Jn3 in the *PMC Specification* P1386.1/Draft 2.0.

Table 2.22: J1 Connector Description (Pn3/Jn3 64-bit PCI)

Pin #	Signal Name	Direction	Description	Electrical Characteristics
1	PCI_RSVD	N/A	Reserved	N/A
2	GND	N/A	GND	GND
3	GND	N/A	GND	GND
4	C/BE[7]#	I/O	PCI Command/Byte Enable Bus	TTL
5	C/BE[6]#	I/O	PCI Command/Byte Enable Bus	TTL
6	C/BE[5]#	I/O	PCI Command/Byte Enable Bus	TTL
7	C/BE[4]#	I/O	PCI Command/Byte Enable Bus	TTL
8	GND	N/A	GND	GND
9	+5V	N/A	5V Supply	+5V
10	PAR64	I/O	PCI Parity Signal	TTL
11	AD[63]	I/O	PCI Address/Data Bus	TTL
12	AD[62]	I/O	PCI Address/Data Bus	TTL
13	AD[61]	I/O	PCI Address/Data Bus	TTL
14	GND	N/A	GND	GND
15	GND	N/A	GND	GND
16	AD[60]	I/O	PCI Address/Data Bus	TTL
17	AD[59]	I/O	PCI Address/Data Bus	TTL
18	AD[58]	I/O	PCI Address/Data Bus	TTL
19	AD[57]	I/O	PCI Address/Data Bus	TTL
20	GND	N/A	GND	GND
21	+5V	N/A	5V Supply	+5V
22	AD[56]	I/O	PCI Address/Data Bus	TTL
23	AD[55]	I/O	PCI Address/Data Bus	TTL
24	AD[54]	I/O	PCI Address/Data Bus	TTL
25	AD[53]	I/O	PCI Address/Data Bus	TTL
26	GND	N/A	GND	GND
27	GND	N/A	GND	GND
28	AD[52]	I/O	PCI Address/Data Bus	TTL
29	AD[51]	I/O	PCI Address/Data Bus	TTL
30	AD[50]	I/O	PCI Address/Data Bus	TTL

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Table 2.22: J1 Connector Description (Pn3/Jn3 64-bit PCI) (Continued)

Pin #	Signal Name	Direction	Description	Electrical Characteristics
31	AD[49]	I/O	PCI Address/Data Bus	TTL
32	GND	N/A	GND	GND
33	GND	N/A	GND	GND
34	AD[48]	I/O	PCI Address/Data Bus	TTL
35	AD[47]	I/O	PCI Address/Data Bus	TTL
36	AD[46]	I/O	PCI Address/Data Bus	TTL
37	AD[45]	I/O	PCI Address/Data Bus	TTL
38	GND	N/A	GND	GND
39	+5V	N/A	+5V Supply	+5V
40	AD[44]	I/O	PCI Address/Data Bus	TTL
41	AD[43]	I/O	PCI Address/Data Bus	TTL
42	AD[42]	I/O	PCI Address/Data Bus	TTL
43	AD[41]	I/O	PCI Address/Data Bus	TTL
44	GND	N/A	GND	GND
45	GND	N/A	GND	GND
46	AD[40]	I/O	PCI Address/Data Bus	TTL
47	AD[39]	I/O	PCI Address/Data Bus	TTL
48	AD[38]	I/O	PCI Address/Data Bus	TTL
49	AD[37]	I/O	PCI Address/Data Bus	TTL
50	GND	N/A	GND	GND
51	GND	N/A	GND	GND
52	AD[36]	I/O	PCI Address/Data Bus	TTL
53	AD[35]	I/O	PCI Address/Data Bus	TTL
54	AD[34]	I/O	PCI Address/Data Bus	TTL
55	AD[33]	I/O	PCI Address/Data Bus	TTL
56	GND	N/A	GND	GND
57	+5V	N/A	+5V Supply	+5V
58	AD[32]	I/O	PCI Address/Data Bus	TTL
59	RESERVED	N/A	RESERVED	N/A
60	RESERVED	N/A	RESERVED	N/A
61	RESERVED	N/A	RESERVED	N/A
62	GND	N/A	GND	GND
63	GND	N/A	GND	GND
64	RESERVED	N/A	RESERVED	N/A

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J2 Connector

Table 2.23 lists the pin assignments for the connector referenced J2. This connector is part of PMC site #2, and is referenced as Pn1/Jn1 in the *PMC Specification* P1386.1/Draft 2.0.

Table 2.23: J2 Connector Description (Pn1/Jn1 64-bit PCI)

Pin #	Signal Name	Direction	Description	Electrical Characteristics
1	TCK	I	JTAG Test Clock	TTL
2	-12V	N/A	-12V Supply	-12V
3	GND	N/A	GND	GND
4	INTA#	I	PMC Interrupt Request Line	TTL
5	INTB#	I	PMC Interrupt Request Line	TTL
6	INTC#	I	PMC Interrupt Request Line	TTL
7	PRSNT2#	I	BUSMODE1 signal, used to indicate presence of a PMC module in site 2	TTL
8	+5V	N/A	Positive Supply	+5V
9	INTD#	I	PMC Interrupt Request Line	TTL
10	RESERVED	N/A	RESERVED	N/A
11	GND	N/A	GND	GND
12	RESERVED	N/A	RESERVED	N/A
13	PCICLK2	O	PCI Clock Signal	TTL
14	GND	N/A	GND	GND
15	GND	N/A	GND	GND
16	PMC2_GNT#	O	Arbitration Grant Signal to PMC site #2	TTL
17	PMC2_REQ#	I	Arbitration Request Signal from PMC site #2	TTL
18	+5V	N/A	Positive Supply	+5V
19	RESERVED	N/A	RESERVED	N/A
20	AD[31]	I/O	PCI Address/Data Bus	TTL
21	AD[28]	I/O	PCI Address/Data Bus	TTL
22	AD[27]	I/O	PCI Address/Data Bus	TTL
23	AD[25]	I/O	PCI Address/Data Bus	TTL
24	GND	N/A	GND	GND
25	GND	N/A	GND	GND
26	C/BE[3]#	I/O	PCI Command/Byte Enable Bus	TTL
27	AD[22]	I/O	PCI Address/Data Bus	TTL
28	AD[21]	I/O	PCI Address/Data Bus	TTL
29	AD[19]	I/O	PCI Address/Data Bus	TTL
30	+5V	N/A	Positive Supply	+5V

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Table 2.23: J2 Connector Description (Pn1/Jn1 64-bit PCI) (Continued)

Pin #	Signal Name	Direction	Description	Electrical Characteristics
31	RESERVED	N/A	RESERVED	N/A
32	AD[17]	I/O	PCI Address/Data Bus	TTL
33	FRAME#	I/O	PCI Cycle Frame Signal	TTL
34	GND	N/A	GND	GND
35	GND	N/A	GND	GND
36	IRDY#	I/O	PCI Initiator Ready Signal	TTL
37	DEVSEL#	I/O	PCI Device Select Signal	TTL
38	+5V	N/A	Positive Supply	+5V
39	GND	N/A	GND	GND
40	LOCK#	I/O	PCI Lock Signal	I/O
41	RESERVED	N/A	RESERVED	N/A
42	RESERVED	N/A	RESERVED	N/A
43	PAR	I/O	PCI Parity Signal	TTL
44	GND	N/A	GND	GND
45	RESERVED	N/A	RESERVED	N/A
46	AD[15]	I/O	PCI Address/Data Bus	TTL
47	AD[12]	I/O	PCI Address/Data Bus	TTL
48	AD[11]	I/O	PCI Address/Data Bus	TTL
49	AD[09]	I/O	PCI Address/Data Bus	TTL
50	+5V	N/A	Positive Supply	+5V
51	GND	N/A	GND	GND
52	C/BE[0]#	I/O	PCI Command/Byte Enable Bus	TTL
53	AD[06]	I/O	PCI Address/Data Bus	TTL
54	AD[05]	I/O	PCI Address/Data Bus	TTL
55	AD[04]	I/O	PCI Address/Data Bus	TTL
56	GND	N/A	GND	GND
57	RESERVED	N/A	RESERVED	N/A
58	AD[03]	I/O	PCI Address/Data Bus	TTL
59	AD[02]	I/O	PCI Address/Data Bus	TTL
60	AD[01]	I/O	PCI Address/Data Bus	TTL
61	AD[00]	I/O	PCI Address/Data Bus	TTL
62	+5V	N/A	Positive Supply	+5V
63	GND	N/A	GND	GND
64	RESERVED	N/A	RESERVED	N/A

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J3 Connector

Table 2.23 lists the pin assignments for the connector referenced J3. This connector is part of PMC site #1, and is referenced as Pn3/Jn3 in the *PMC Specification* P1386.1/Draft 2.0.

Table 2.24: J3 Connector Description (Pn3/Jn3 64-bit PCI)

Pin #	Signal Name	Direction	Description	Electrical Characteristics
1	PCI_RSVD	N/A	Reserved	N/A
2	GND	N/A	GND	GND
3	GND	N/A	GND	GND
4	C/BE[7]#	I/O	PCI Command/Byte Enable Bus	TTL
5	C/BE[6]#	I/O	PCI Command/Byte Enable Bus	TTL
6	C/BE[5]#	I/O	PCI Command/Byte Enable Bus	TTL
7	C/BE[4]#	I/O	PCI Command/Byte Enable Bus	TTL
8	GND	N/A	GND	GND
9	+5V	N/A	5V Supply	+5V
10	PAR64	I/O	PCI Parity Signal	TTL
11	AD[63]	I/O	PCI Address/Data Bus	TTL
12	AD[62]	I/O	PCI Address/Data Bus	TTL
13	AD[61]	I/O	PCI Address/Data Bus	TTL
14	GND	N/A	GND	GND
15	GND	N/A	GND	GND
16	AD[60]	I/O	PCI Address/Data Bus	TTL
17	AD[59]	I/O	PCI Address/Data Bus	TTL
18	AD[58]	I/O	PCI Address/Data Bus	TTL
19	AD[57]	I/O	PCI Address/Data Bus	TTL
20	GND	N/A	GND	GND
21	+5V	N/A	5V Supply	+5V
22	AD[56]	I/O	PCI Address/Data Bus	TTL
23	AD[55]	I/O	PCI Address/Data Bus	TTL
24	AD[54]	I/O	PCI Address/Data Bus	TTL
25	AD[53]	I/O	PCI Address/Data Bus	TTL
26	GND	N/A	GND	GND
27	GND	N/A	GND	GND
28	AD[52]	I/O	PCI Address/Data Bus	TTL
29	AD[51]	I/O	PCI Address/Data Bus	TTL
30	AD[50]	I/O	PCI Address/Data Bus	TTL

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Table 2.24: J3 Connector Description (Pn3/Jn3 64-bit PCI) (Continued)

Pin #	Signal Name	Direction	Description	Electrical Characteristics
31	AD[49]	I/O	PCI Address/Data Bus	TTL
32	GND	N/A	GND	GND
33	GND	N/A	GND	GND
34	AD[48]	I/O	PCI Address/Data Bus	TTL
35	AD[47]	I/O	PCI Address/Data Bus	TTL
36	AD[46]	I/O	PCI Address/Data Bus	TTL
37	AD[45]	I/O	PCI Address/Data Bus	TTL
38	GND	N/A	GND	GND
39	+5V	N/A	+5V Supply	+5V
40	AD[44]	I/O	PCI Address/Data Bus	TTL
41	AD[43]	I/O	PCI Address/Data Bus	TTL
42	AD[42]	I/O	PCI Address/Data Bus	TTL
43	AD[41]	I/O	PCI Address/Data Bus	TTL
44	GND	N/A	GND	GND
45	GND	N/A	GND	GND
46	AD[40]	I/O	PCI Address/Data Bus	TTL
47	AD[39]	I/O	PCI Address/Data Bus	TTL
48	AD[38]	I/O	PCI Address/Data Bus	TTL
49	AD[37]	I/O	PCI Address/Data Bus	TTL
50	GND	N/A	GND	GND
51	GND	N/A	GND	GND
52	AD[36]	I/O	PCI Address/Data Bus	TTL
53	AD[35]	I/O	PCI Address/Data Bus	TTL
54	AD[34]	I/O	PCI Address/Data Bus	TTL
55	AD[33]	I/O	PCI Address/Data Bus	TTL
56	GND	N/A	GND	GND
57	+5V	N/A	+5V Supply	+5V
58	AD[32]	I/O	PCI Address/Data Bus	TTL
59	RESERVED	N/A	RESERVED	N/A
60	RESERVED	N/A	RESERVED	N/A
61	RESERVED	N/A	RESERVED	N/A
62	GND	N/A	GND	GND
63	GND	N/A	GND	GND
64	RESERVED	N/A	RESERVED	N/A

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J4 Connector

Table 2.25 lists the pin assignments for the connector referenced J4. This connector is part of PMC site #1, and is referenced as Pn1/Jn1 in the PMC specification P1386.1/Draft 2.0.

Table 2.25: J4 Connector Description (Pn1/Jn1 64-bit PCI)

Pin #	Signal	Direction	Description	Electrical Characteristics
1	TCK	I	JTAG Test Clock	TTL
2	-12V	N/A	-12V Supply	-12V
3	GND	N/A	GND	GND
4	INTA#	I	PMC Interrupt Request Line	TTL
5	INTB#	I	PMC Interrupt Request Line	TTL
6	INTC#	I	PMC Interrupt Request Line	TTL
7	PRSNT1#	I	BUSMODE1 signal, used to indicate presence of a PMC module in site 1	TTL
8	+5V	N/A	Positive Supply	+5V
9	INTD#	I	PMC Interrupt Request Line	TTL
10	RESERVED	N/A	RESERVED	N/A
11	GND	N/A	GND	GND
12	RESERVED	N/A	RESERVED	N/A
13	PCICLK1	O	PCI Clock Signal	TTL
14	GND	N/A	GND	GND
15	GND	N/A	GND	GND
16	PMC1_GNT#	O	Arbitration Grant Signal to PMC site #1	TTL
17	PMC1_REQ#	I	Arbitration Request Signal from PMC site #1	TTL
18	+5V	N/A	Positive Supply	+5V
19	RESERVED	N/A	RESERVED	N/A
20	AD[31]	I/O	PCI Address/Data Bus	TTL
21	AD[28]	I/O	PCI Address/Data Bus	TTL
22	AD[27]	I/O	PCI Address/Data Bus	TTL
23	AD[25]	I/O	PCI Address/Data Bus	TTL
24	GND	N/A	GND	GND
25	GND	N/A	GND	GND
26	C/BE[3]#	I/O	PCI Command/Byte Enable Bus	TTL
27	AD[22]	I/O	PCI Address/Data Bus	TTL
28	AD[21]	I/O	PCI Address/Data Bus	TTL
29	AD[19]	I/O	PCI Address/Data Bus	TTL
30	+5V	N/A	Positive Supply	+5V

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Table 2.25: J4 Connector Description (Pn1/Jn1 64-bit PCI) (Continued)

Pin #	Signal	Direction	Description	Electrical Characteristics
31	RESERVED	N/A	RESERVED	N/A
32	AD[17]	I/O	PCI Address/Data Bus	TTL
33	FRAME#	I/O	PCI Cycle Frame Signal	TTL
34	GND	N/A	GND	GND
35	GND	N/A	GND	GND
36	IRDY#	I/O	PCI Initiator Ready Signal	TTL
37	DEVSEL#	I/O	PCI Device Select Signal	TTL
38	+5V	N/A	Positive Supply	+5V
39	GND	N/A	GND	GND
40	LOCK#	I/O	PCI Lock Signal	I/O
41	RESERVED	N/A	RESERVED	N/A
42	RESERVED	N/A	RESERVED	N/A
43	PAR	I/O	PCI Parity Signal	TTL
44	GND	N/A	GND	GND
45	RESERVED	N/A	RESERVED	N/A
46	AD[15]	I/O	PCI Address/Data Bus	TTL
47	AD[12]	I/O	PCI Address/Data Bus	TTL
48	AD[11]	I/O	PCI Address/Data Bus	TTL
49	AD[09]	I/O	PCI Address/Data Bus	TTL
50	+5V	N/A	Positive Supply	+5V
51	GND	N/A	GND	GND
52	C/BE[0]#	I/O	PCI Command/Byte Enable Bus	TTL
53	AD[06]	I/O	PCI Address/Data Bus	TTL
54	AD[05]	I/O	PCI Address/Data Bus	TTL
55	AD[04]	I/O	PCI Address/Data Bus	TTL
56	GND	N/A	GND	GND
57	RESERVED	N/A	RESERVED	N/A
58	AD[03]	I/O	PCI Address/Data Bus	TTL
59	AD[02]	I/O	PCI Address/Data Bus	TTL
60	AD[01]	I/O	PCI Address/Data Bus	TTL
61	AD[00]	I/O	PCI Address/Data Bus	TTL
62	+5V	N/A	Positive Supply	+5V
63	GND	N/A	GND	GND
64	RESERVED	N/A	RESERVED	N/A

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J5 Connector

Table 2.26 lists the pin assignments for the connector referenced J5. This connector is part of PMC site #2, and is referenced as Pn4/Jn4 in the PMC specification P1386.1/Draft 2.0.

Table 2.26: J5 Connector Description (Pn4/Jn4 User Defined I/O)

Pin #	P2 Pin Number	Direction	Description	Electrical Characteristics
1	P2-C1	I/O	PMC #2 connection to P2 connector	Depends on module
2	P2-A1	I/O	PMC #2 connection to P2 connector	Depends on module
3	P2-C2	I/O	PMC #2 connection to P2 connector	Depends on module
4	P2-A2	I/O	PMC #2 connection to P2 connector	Depends on module
5	P2-C3	I/O	PMC #2 connection to P2 connector	Depends on module
6	P2-A3	I/O	PMC #2 connection to P2 connector	Depends on module
7	P2-C4	I/O	PMC #2 connection to P2 connector	Depends on module
8	P2-A4	I/O	PMC #2 connection to P2 connector	Depends on module
9	P2-C5	I/O	PMC #2 connection to P2 connector	Depends on module
10	P2-A5	I/O	PMC #2 connection to P2 connector	Depends on module
11	P2-C6	I/O	PMC #2 connection to P2 connector	Depends on module
12	P2-A6	I/O	PMC #2 connection to P2 connector	Depends on module
13	P2-C7	I/O	PMC #2 connection to P2 connector	Depends on module
14	P2-A7	I/O	PMC #2 connection to P2 connector	Depends on module
15	P2-C8	I/O	PMC #2 connection to P2 connector	Depends on module
16	P2-A8	I/O	PMC #2 connection to P2 connector	Depends on module
17	P2-C9	I/O	PMC #2 connection to P2 connector	Depends on module
18	P2-A9	I/O	PMC #2 connection to P2 connector	Depends on module
19	P2-C10	I/O	PMC #2 connection to P2 connector	Depends on module
20	P2-A10	I/O	PMC #2 connection to P2 connector	Depends on module
21	P2-C11	I/O	PMC #2 connection to P2 connector	Depends on module
22	P2-A11	I/O	PMC #2 connection to P2 connector	Depends on module
23	P2-C12	I/O	PMC #2 connection to P2 connector	Depends on module
24	P2-A12	I/O	PMC #2 connection to P2 connector	Depends on module
25	P2-C13	I/O	PMC #2 connection to P2 connector	Depends on module
26	P2-A13	I/O	PMC #2 connection to P2 connector	Depends on module
27	P2-C14	I/O	PMC #2 connection to P2 connector	Depends on module
28	P2-A14	I/O	PMC #2 connection to P2 connector	Depends on module
29	P2-C15	I/O	PMC #2 connection to P2 connector	Depends on module
30	P2-A15	I/O	PMC #2 connection to P2 connector	Depends on module

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Table 2.26: J5 Connector Description (Pn4/Jn4 User Defined I/O) (Continued)

Pin #	P2 Pin Number	Direction	Description	Electrical Characteristics
31	P2-C16	I/O	PMC #2 connection to P2 connector	Depends on module
32	P2-A16	I/O	PMC #2 connection to P2 connector	Depends on module
33	P2-C17	I/O	PMC #2 connection to P2 connector	Depends on module
34	P2-A17	I/O	PMC #2 connection to P2 connector	Depends on module
35	P2-C18	I/O	PMC #2 connection to P2 connector	Depends on module
36	P2-A18	I/O	PMC #2 connection to P2 connector	Depends on module
37	P2-C19	I/O	PMC #2 connection to P2 connector	Depends on module
38	P2-A19	I/O	PMC #2 connection to P2 connector	Depends on module
39	P2-C20	I/O	PMC #2 connection to P2 connector	Depends on module
40	P2-A20	I/O	PMC #2 connection to P2 connector	Depends on module
41	P2-C21	I/O	PMC #2 connection to P2 connector	Depends on module
42	P2-A21	I/O	PMC #2 connection to P2 connector	Depends on module
43	P2-C22	I/O	PMC #2 connection to P2 connector	Depends on module
44	P2-A22	I/O	PMC #2 connection to P2 connector	Depends on module
45	P2-C23	I/O	PMC #2 connection to P2 connector	Depends on module
46	P2-A23	I/O	PMC #2 connection to P2 connector	Depends on module
47	P2-C24	I/O	PMC #2 connection to P2 connector	Depends on module
48	P2-A24	I/O	PMC #2 connection to P2 connector	Depends on module
49	P2-C25	I/O	PMC #2 connection to P2 connector	Depends on module
50	P2-A25	I/O	PMC #2 connection to P2 connector	Depends on module
51	P2-C26	I/O	PMC #2 connection to P2 connector	Depends on module
52	P2-A26	I/O	PMC #2 connection to P2 connector	Depends on module
53	P2-C27	I/O	PMC #2 connection to P2 connector	Depends on module
54	P2-A27	I/O	PMC #2 connection to P2 connector	Depends on module
55	P2-C28	I/O	PMC #2 connection to P2 connector	Depends on module
56	P2-A28	I/O	PMC #2 connection to P2 connector	Depends on module
57	P2-C29	I/O	PMC #2 connection to P2 connector	Depends on module
58	P2-A29	I/O	PMC #2 connection to P2 connector	Depends on module
59	P2-C30	I/O	PMC #2 connection to P2 connector	Depends on module
60	P2-A30	I/O	PMC #2 connection to P2 connector	Depends on module
61	P2-C31	I/O	PMC #2 connection to P2 connector	Depends on module
62	P2-A31	I/O	PMC #2 connection to P2 connector	Depends on module
63	P2-C32	I/O	PMC #2 connection to P2 connector	Depends on module
64	P2-A32	I/O	PMC #2 connection to P2 connector	Depends on module

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J6 Connector

Table 2.27 lists the pin assignments for the connector referenced J6. This connector is part of PMC site #2, and is referenced as Pn2/Jn2 in the PMC specification P1386.1/Draft 2.0.

Table 2.27: J6 Connector Description (Pn2/Jn2 64-bit PCI)

Pin #	Signal Name	Direction	Description	Electrical Characteristics
1	+12V	N/A	+12V Supply	+12V
2	TRST#	O	JTAG Reset	TTL
3	TMS	I	JTAG Test Mode Select	TTL
4	TDO	O	JTAG Test Data Out	TTL
5	TDI	I	JTAG Test Data In	TTL
6	GND	N/A	GND	GND
7	GND	N/A	GND	GND
8	RESERVED	N/A	RESERVED	N/A
9	RESERVED	N/A	RESERVED	N/A
10	RESERVED	N/A	RESERVED	N/A
11	BUSMODE2	O	Basecard indicates PCI protocol used for PMC interface, by driving this line high	TTL
12	+3.3V	N/A	Positive Supply	+3.3V
13	RST#	O	PCI Reset Signal	TTL
14	BUSMODE3	O	Basecard indicates PCI protocol used for PMC interface, by driving this line low	TTL
15	+3.3V	N/A	Positive Supply	+3.3V
16	BUSMODE4	O	Basecard indicates PCI protocol used for PMC interface, by driving this line low	TTL
17	RESERVED	N/A	RESERVED	N/A
18	GND	N/A	GND	GND
19	AD[30]	I/O	PCI Address/Data Bus	TTL
20	AD[29]	I/O	PCI Address/Data Bus	TTL
21	GND	N/A	GND	GND
22	AD[26]	I/O	PCI Address/Data Bus	TTL
23	AD[24]	I/O	PCI Address/Data Bus	TTL
24	+3.3V	N/A	Positive Supply	+3.3V
25	IDSEL	O	PCI Initialisation Device Select for PMC Site #2	TTL
26	AD[23]	I/O	PCI Address/Data Bus	TTL
27	+3.3V	N/A	Positive Supply	+3.3V
28	AD[20]	I/O	PCI Address/Data Bus	TTL
29	AD[18]	I/O	PCI Address/Data Bus	TTL
30	GND	N/A	GND	GND

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Table 2.27: J6 Connector Description (Pn2/Jn2 64-bit PCI) (Continued)

Pin #	Signal Name	Direction	Description	Electrical Characteristics
31	AD[16]	I/O	PCI Address/Data Bus	TTL
32	C/BE[2]#	I/O	PCI Command/Byte Enable Bus	TTL
33	GND	N/A	GND	GND
34	RESERVED	N/A	RESERVED	N/A
35	TRDY#	I/O	PCI Target Ready	TTL
36	+3.3V	N/A	Positive Supply	+3.3V
37	GND	N/A	GND	GND
38	STOP#	I/O	PCI Transaction Stop Signal	TTL
39	PERR#	I/O	PCI Data Parity Signal	TTL
40	GND	N/A	GND	GND
41	+3.3V	N/A	Positive Supply	+3.3V
42	SERR#	I/O	PCI System Error	TTL
43	C/BE[1]#	I/O	PCI Command/Byte Enable Bus	TTL
44	GND	N/A	GND	GND
45	AD[14]	I/O	PCI Address/Data Bus	TTL
46	AD[13]	I/O	PCI Address/Data Bus	TTL
47	GND	N/A	GND	GND
48	AD[10]	I/O	PCI Address/Data Bus	TTL
49	AD[08]	I/O	PCI Address/Data Bus	TTL
50	+3.3V	N/A	Positive Supply	+3.3V
51	AD[07]	I/O	PCI Address/Data Bus	TTL
52	RESERVED	N/A	RESERVED	N/A
53	+3.3V	N/A	Positive Supply	+3.3V
54	RESERVED	N/A	RESERVED	N/A
55	RESERVED	N/A	RESERVED	N/A
56	GND	N/A	GND	GND
57	RESERVED	N/A	RESERVED	N/A
58	RESERVED	N/A	RESERVED	N/A
59	GND	N/A	GND	GND
60	RESERVED	N/A	RESERVED	N/A
61	RESERVED	N/A	RESERVED	N/A
62	+3.3V	N/A	Positive Supply	+3.3V
63	GND	N/A	GND	GND
64	RESERVED	N/A	RESERVED	N/A

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J7 Connector

Table 2.28 lists the pin assignments for the connector referenced J7. This connector is part of PMC site #1, and is referenced as Pn4/Jn4 in the PMC specification P1386.1/Draft 2.0.

Table 2.28: J7 Connector Description (Pn4/Jn4 User Defined I/O)

Pin #	P0 Pin Number	Direction	Description	Electrical Characteristics
1	P0-E4	I/O	PMC #1 connection to P0 connector	Depends on module
2	P0-D4	I/O	PMC #1 connection to P0 connector	Depends on module
3	P0-C4	I/O	PMC #1 connection to P0 connector	Depends on module
4	P0-B4	I/O	PMC #1 connection to P0 connector	Depends on module
5	P0-A4	I/O	PMC #1 connection to P0 connector	Depends on module
6	P0-E5	I/O	PMC #1 connection to P0 connector	Depends on module
7	P0-D5	I/O	PMC #1 connection to P0 connector	Depends on module
8	P0-C5	I/O	PMC #1 connection to P0 connector	Depends on module
9	P0-B5	I/O	PMC #1 connection to P0 connector	Depends on module
10	P0-A5	I/O	PMC #1 connection to P0 connector	Depends on module
11	P0-E6	I/O	PMC #1 connection to P0 connector	Depends on module
12	P0-D6	I/O	PMC #1 connection to P0 connector	Depends on module
13	P0-C6	I/O	PMC #1 connection to P0 connector	Depends on module
14	P0-B6	I/O	PMC #1 connection to P0 connector	Depends on module
15	P0-A6	I/O	PMC #1 connection to P0 connector	Depends on module
16	P0-E7	I/O	PMC #1 connection to P0 connector	Depends on module
17	P0-D7	I/O	PMC #1 connection to P0 connector	Depends on module
18	P0-C7	I/O	PMC #1 connection to P0 connector	Depends on module
19	P0-B7	I/O	PMC #1 connection to P0 connector	Depends on module
20	P0-A7	I/O	PMC #1 connection to P0 connector	Depends on module
21	P0-E8	I/O	PMC #1 connection to P0 connector	Depends on module
22	P0-D8	I/O	PMC #1 connection to P0 connector	Depends on module
23	P0-C8	I/O	PMC #1 connection to P0 connector	Depends on module
24	P0-B8	I/O	PMC #1 connection to P0 connector	Depends on module
25	P0-A8	I/O	PMC #1 connection to P0 connector	Depends on module
26	P0-E12	I/O	PMC #1 connection to P0 connector	Depends on module
27	P0-D12	I/O	PMC #1 connection to P0 connector	Depends on module
28	P0-C12	I/O	PMC #1 connection to P0 connector	Depends on module
29	P0-B12	I/O	PMC #1 connection to P0 connector	Depends on module
30	P0-A12	I/O	PMC #1 connection to P0 connector	Depends on module

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Table 2.28: J7 Connector Description (Pn4/Jn4 User Defined I/O) (Continued)

Pin #	P0 Pin Number	Direction	Description	Electrical Characteristics
31	P0-E13	I/O	PMC #1 connection to P0 connector	Depends on module
32	P0-D13	I/O	PMC #1 connection to P0 connector	Depends on module
33	P0-C13	I/O	PMC #1 connection to P0 connector	Depends on module
34	P0-B13	I/O	PMC #1 connection to P0 connector	Depends on module
35	P0-A13	I/O	PMC #1 connection to P0 connector	Depends on module
36	P0-E14	I/O	PMC #1 connection to P0 connector	Depends on module
37	P0-D14	I/O	PMC #1 connection to P0 connector	Depends on module
38	P0-C14	I/O	PMC #1 connection to P0 connector	Depends on module
39	P0-B14	I/O	PMC #1 connection to P0 connector	Depends on module
40	P0-A14	I/O	PMC #1 connection to P0 connector	Depends on module
41	P0-E15	I/O	PMC #1 connection to P0 connector	Depends on module
42	P0-D15	I/O	PMC #1 connection to P0 connector	Depends on module
43	P0-C15	I/O	PMC #1 connection to P0 connector	Depends on module
44	P0-B15	I/O	PMC #1 connection to P0 connector	Depends on module
45	P0-A15	I/O	PMC #1 connection to P0 connector	Depends on module
46	P0-E16	I/O	PMC #1 connection to P0 connector	Depends on module
47	P0-D16	I/O	PMC #1 connection to P0 connector	Depends on module
48	P0-C16	I/O	PMC #1 connection to P0 connector	Depends on module
49	P0-B16	I/O	PMC #1 connection to P0 connector	Depends on module
50	P0-A16	I/O	PMC #1 connection to P0 connector	Depends on module
51	P0-E17	I/O	PMC #1 connection to P0 connector	Depends on module
52	P0-D17	I/O	PMC #1 connection to P0 connector	Depends on module
53	P0-C17	I/O	PMC #1 connection to P0 connector	Depends on module
54	P0-B17	I/O	PMC #1 connection to P0 connector	Depends on module
55	P0-A17	I/O	PMC #1 connection to P0 connector	Depends on module
56	P0-E18	I/O	PMC #1 connection to P0 connector	Depends on module
57	P0-D18	I/O	PMC #1 connection to P0 connector	Depends on module
58	P0-C18	I/O	PMC #1 connection to P0 connector	Depends on module
59	P0-B18	I/O	PMC #1 connection to P0 connector	Depends on module
60	P0-A18	I/O	PMC #1 connection to P0 connector	Depends on module
61	P0-E19	I/O	PMC #1 connection to P0 connector	Depends on module
62	P0-D19	I/O	PMC #1 connection to P0 connector	Depends on module
63	P0-C19	I/O	PMC #1 connection to P0 connector	Depends on module
64	P0-B19	I/O	PMC #1 connection to P0 connector	Depends on module

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J8 Connector

Table 2.29 lists the pin assignments for the connector referenced J8. This connector is part of PMC site #1, and is referenced as Pn2/Jn2 in the PMC specification P1386.1/Draft 2.0.

Table 2.29: J8 Connector Description (Pn2/Jn2 64-bit PCI)

Pin #	Signal	Direction	Description	Electrical Characteristics
1	+12V	N/A	+12V Supply	+12V
2	TRST#	O	JTAG Reset	TTL
3	TMS	I	JTAG Test Mode Select	TTL
4	TDO	O	JTAG Test Data Out	TTL
5	TDI	I	JTAG Test Data In	TTL
6	GND	N/A	GND	GND
7	GND	N/A	GND	GND
8	RESERVED	N/A	RESERVED	N/A
9	RESERVED	N/A	RESERVED	N/A
10	RESERVED	N/A	RESERVED	N/A
11	BUSMODE2	O	Basecard indicates PCI protocol used for PMC interface, by driving this line high	TTL
12	+3.3V	N/A	Positive Supply	+3.3V
13	RST#	O	PCI Reset Signal	TTL
14	BUSMODE3	O	Basecard indicates PCI protocol used for PMC interface, by driving this line low	TTL
15	+3.3V	N/A	Positive Supply	+3.3V
16	BUSMODE4	O	Basecard indicates PCI protocol used for PMC interface, by driving this line low	TTL
17	RESERVED	N/A	RESERVED	N/A
18	GND	N/A	GND	GND
19	AD[30]	I/O	PCI Address/Data Bus	TTL
20	AD[29]	I/O	PCI Address/Data Bus	TTL
21	GND	N/A	GND	GND
22	AD[26]	I/O	PCI Address/Data Bus	TTL
23	AD[24]	I/O	PCI Address/Data Bus	TTL
24	+3.3V	N/A	Positive Supply	+3.3V
25	IDSEL	O	PCI Initialisation Device Select for PMC Site #1	TTL
26	AD[23]	I/O	PCI Address/Data Bus	TTL
27	+3.3V	N/A	Positive Supply	+3.3V
28	AD[20]	I/O	PCI Address/Data Bus	TTL
29	AD[18]	I/O	PCI Address/Data Bus	TTL

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Table 2.29: J8 Connector Description (Pn2/Jn2 64-bit PCI) (Continued)

Pin #	Signal	Direction	Description	Electrical Characteristics
30	GND	N/A	GND	GND
31	AD[16]	I/O	PCI Address/Data Bus	TTL
32	C/BE[2]#	I/O	PCI Command/Byte Enable Bus	TTL
33	GND	N/A	GND	GND
34	RESERVED	N/A	RESERVED	N/A
35	TRDY#	I/O	PCI Target Ready	TTL
36	+3.3V	N/A	Positive Supply	+3.3V
37	GND	N/A	GND	GND
38	STOP#	I/O	PCI Transaction Stop Signal	TTL
39	PERR#	I/O	PCI Data Parity Signal	TTL
40	GND	N/A	GND	GND
41	+3.3V	N/A	Positive Supply	+3.3V
42	SERR#	I/O	PCI System Error	TTL
43	C/BE[1]#	I/O	PCI Command/Byte Enable Bus	TTL
44	GND	N/A	GND	GND
45	AD[14]	I/O	PCI Address/Data Bus	TTL
46	AD[13]	I/O	PCI Address/Data Bus	TTL
47	GND	N/A	GND	GND
48	AD[10]	I/O	PCI Address/Data Bus	TTL
49	AD[08]	I/O	PCI Address/Data Bus	TTL
50	+3.3V	N/A	Positive Supply	+3.3V
51	AD[07]	I/O	PCI Address/Data Bus	TTL
52	RESERVED	N/A	RESERVED	N/A
53	+3.3V	N/A	Positive Supply	+3.3V
54	RESERVED	N/A	RESERVED	N/A
55	RESERVED	N/A	RESERVED	N/A
56	GND	N/A	GND	GND
57	RESERVED	N/A	RESERVED	N/A
58	RESERVED	N/A	RESERVED	N/A
59	GND	N/A	GND	GND
60	RESERVED	N/A	RESERVED	N/A
61	RESERVED	N/A	RESERVED	N/A
62	+3.3V	N/A	Positive Supply	+3.3V
63	GND	N/A	GND	GND
64	RESERVED	N/A	RESERVED	N/A

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Using the SVME/DMV-179 Pinout Configurator

The P0 and P2 pinouts of the SVME/DMV-179 vary according to the I/O mode and the number and variety of PMC modules installed on the basecard. The SVME/DMV-179 Technical Documentation CD-ROM contains a utility that calculates the P0 and P2 pinout configuration based on the PMC modules you have installed. This utility lets you choose from existing DY 4 PMC modules or input pinouts for third-party or future DY 4 modules.

Note

The SVME/DMV-179 Pinout Configurator is a 32-bit Windows application that runs only under Windows 95, Windows 98, Windows 2000, and Windows NT.

Starting the Pinout Configurator

To start the SVME/DMV-179 Pinout Configurator from the CD-ROM, follow these steps:

1. Insert the CD-ROM in your CD-ROM drive. The Dy 4 Technical Documentation window appears.

   Note

   If the Dy 4 Technical Documentation window does not appear, choose **Run** from the Start button, then type `d:\autorun.exe` in the Run dialog box. If your CD-ROM drive letter is not D, substitute the right letter.

2. Click the **SVME/DMV-179 Pinout Configuration** icon.

   The **Select the I/O Mode** window appears, as shown in Figure 2.4 on page 2-45.

Select the I/O Mode

3. Consult the Product Release Note for your SVME/DMV-179 to determine the I/O mode of your card. Click the radio button corresponding to the I/O mode.
4. Click the **OK** button.

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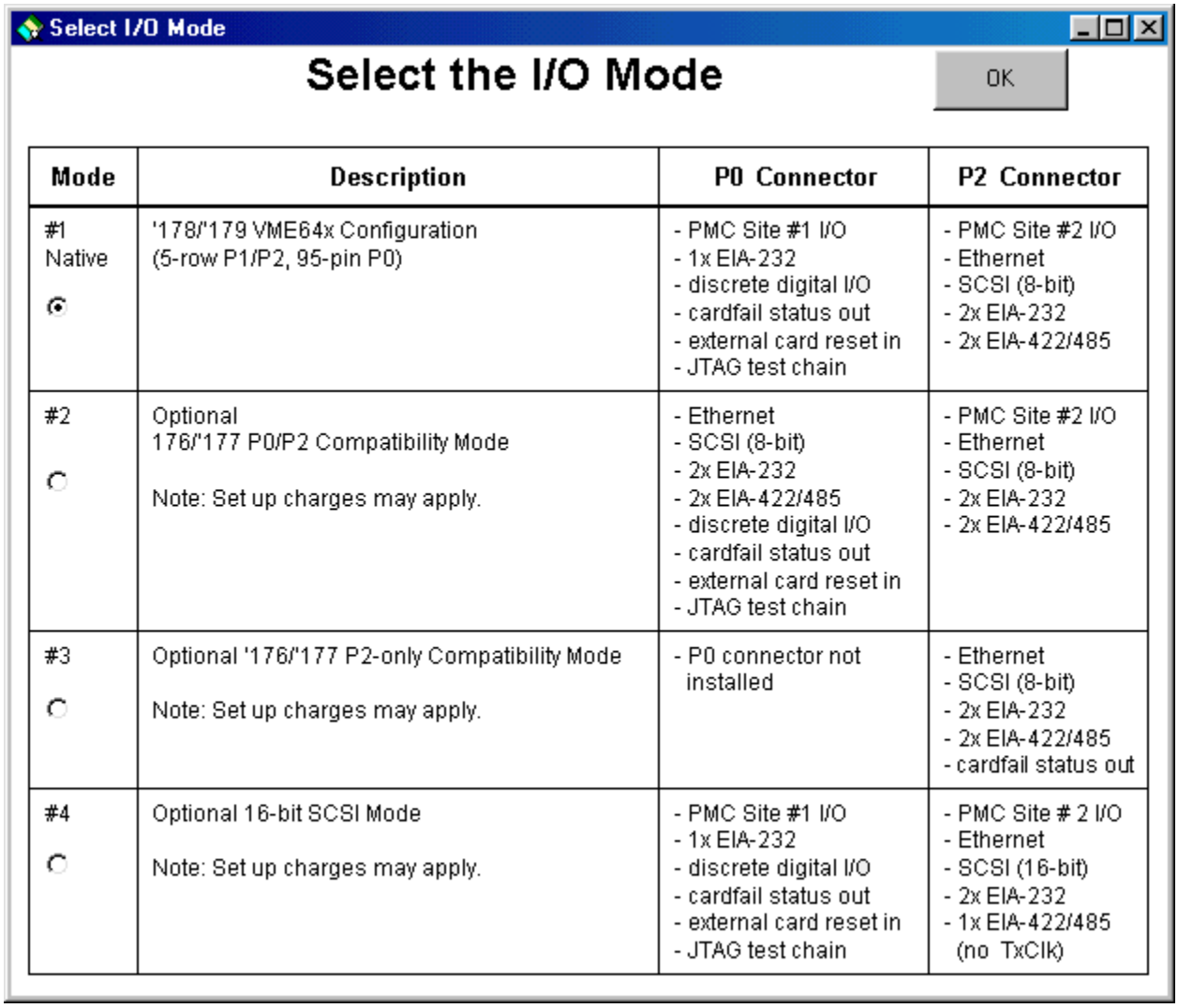

Mode	Description	P0 Connector	P2 Connector
#1 Native ◉	'178/'179 VME64x Configuration (5-row P1/P2, 95-pin P0)	- PMC Site #1 I/O - 1x EIA-232 - discrete digital I/O - cardfail status out - external card reset in - JTAG test chain	- PMC Site #2 I/O - Ethernet - SCSI (8-bit) - 2x EIA-232 - 2x EIA-422/485
#2 ○	Optional 176/'177 P0/P2 Compatibility Mode Note: Set up charges may apply.	- Ethernet - SCSI (8-bit) - 2x EIA-232 - 2x EIA-422/485 - discrete digital I/O - cardfail status out - external card reset in - JTAG test chain	- PMC Site #2 I/O - Ethernet - SCSI (8-bit) - 2x EIA-232 - 2x EIA-422/485
#3 ○	Optional '176/'177 P2-only Compatibility Mode Note: Set up charges may apply.	- P0 connector not installed	- Ethernet - SCSI (8-bit) - 2x EIA-232 - 2x EIA-422/485 - cardfail status out
#4 ○	Optional 16-bit SCSI Mode Note: Set up charges may apply.	- PMC Site #1 I/O - 1x EIA-232 - discrete digital I/O - cardfail status out - external card reset in - JTAG test chain	- PMC Site # 2 I/O - Ethernet - SCSI (16-bit) - 2x EIA-232 - 1x EIA-422/485 (no TxClk)

Figure 2.4 I/O Mode Window

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The Configurator main window appears, as shown in Figure 2.30.

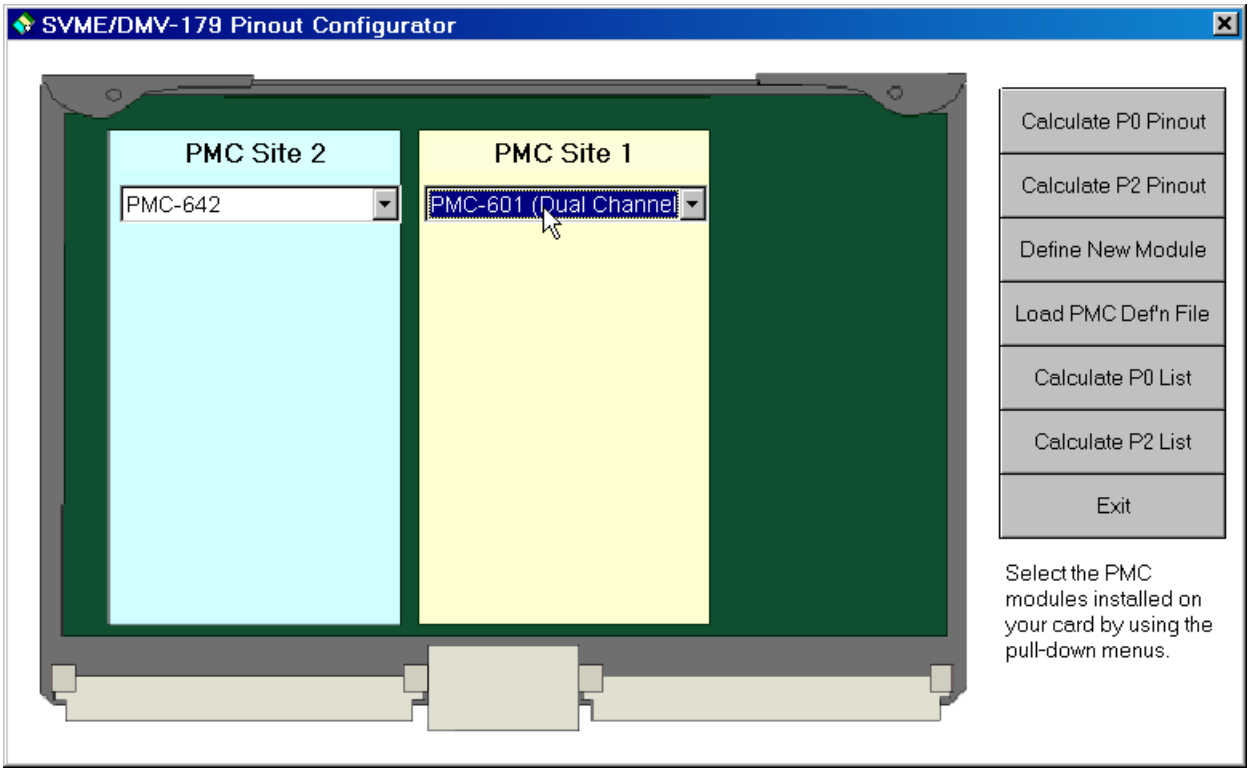

Table 2.30: SVME/DMV-179 Pinout Configurator Main Window

Select the PMC Modules

Cross Reference

5. The main window has two drop-down lists, each corresponding to a PMC slot on the SVME/DMV-179. Choose the PMC module you have installed in each PMC slot from the corresponding list.

   If your SVME/DMV-179 has PMC modules installed that are not listed in the drop-down list, refer to the section "Defining New PMC Modules" on page 2-49.

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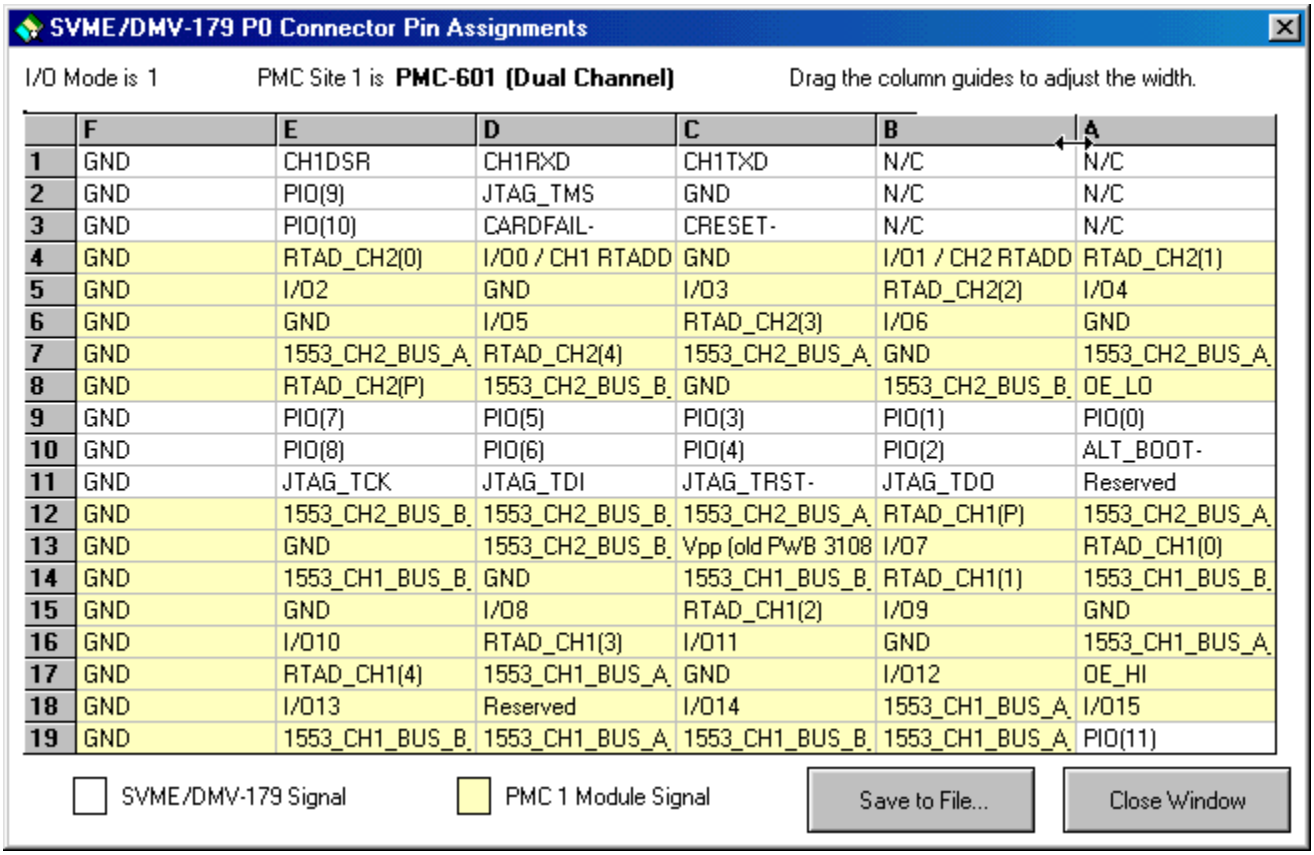
Calculating P0 and P2 Pinouts

6. To calculate the P0 pinout table for your SVME/DMV-179, click the **Calculate P0 Pinout** button.The application displays the P0 pinout table for your configuration, as shown in the example in Figure 2.31.

   You may adjust the column widths of the table by dragging the column guides in the header row.


SVME/DMV-179 P0 Connector Pin Assignments
I/O Mode is 1
PMC Site 1 is PMC-601 (Dual Channel)
Drag the column guides to adjust the width.
SVME/DMV-179 Signal
PMC 1 Module Signal
Save to File...
Close Window

	F	E	D	C	B	A
1	GND	CH1DSR	CH1RXD	CH1TXD	N/C	N/C
2	GND	PIO(9)	JTAG_TMS	GND	N/C	N/C
3	GND	PIO(10)	CARDFAIL-	CRESET-	N/C	N/C
4	GND	RTAD_CH2(0)	I/O0 / CH1 RTADD	GND	I/O1 / CH2 RTADD	RTAD_CH2(1)
5	GND	I/O2	GND	I/O3	RTAD_CH2(2)	I/O4
6	GND	GND	I/O5	RTAD_CH2(3)	I/O6	GND
7	GND	1553_CH2_BUS_A	RTAD_CH2(4)	1553_CH2_BUS_A	GND	1553_CH2_BUS_A
8	GND	RTAD_CH2(P)	1553_CH2_BUS_B	GND	1553_CH2_BUS_B	OE_LO
9	GND	PIO(7)	PIO(5)	PIO(3)	PIO(1)	PIO(0)
10	GND	PIO(8)	PIO(6)	PIO(4)	PIO(2)	ALT_BOOT-
11	GND	JTAG_TCK	JTAG_TDI	JTAG_TRST-	JTAG_TDO	Reserved
12	GND	1553_CH2_BUS_B	1553_CH2_BUS_B	1553_CH2_BUS_A	RTAD_CH1(P)	1553_CH2_BUS_A
13	GND	GND	1553_CH2_BUS_B	Vpp (old PWB 3108	I/O7	RTAD_CH1(0)
14	GND	1553_CH1_BUS_B	GND	1553_CH1_BUS_B	RTAD_CH1(1)	1553_CH1_BUS_B
15	GND	GND	I/O8	RTAD_CH1(2)	I/O9	GND
16	GND	I/O10	RTAD_CH1(3)	I/O11	GND	1553_CH1_BUS_A
17	GND	RTAD_CH1(4)	1553_CH1_BUS_A	GND	I/O12	OE_HI
18	GND	I/O13	Reserved	I/O14	1553_CH1_BUS_A	I/O15
19	GND	1553_CH1_BUS_B	1553_CH1_BUS_A	1553_CH1_BUS_B	1553_CH1_BUS_A	PIO(11)

Table 2.31: Sample P0 Pinout Table

7. To calculate the P2 pinout table for your SVME/DMV-179, click the **Calculate P2 Pinout** button.The application displays the P2 pinout table for your configuration, as shown in the example in Figure 2.32 on page 2-48.

   You may adjust the column widths of the table by dragging the column. guides in the header row.

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SVME/DMV-179 P2 Connector Pin Assignments

I/O Mode is 1 PMC Site 2 is PMC-642 SVME/DMV-179 Signal PMC 2 Module Signal

	D	C	B	A	Z
1	SATN	FC_PMC_RD1+	+5V	FC_PMC_TX1+	SD00
2	SBSY	FC_PMC_RD1-	GND	FC_PMC_TX1-	GND
3	SACK	GND	Reserved	GND	SD01
4	SRST	GND	A24	GND	GND
5	SMSG	GND	A25	GND	SD02
6	SSEL		A26		GND
7	SCD		A27		SD03
8	SREQ		A28		GND
9	SIO		A29	GND	SD04
10	TERMPWR		A30		GND
11	CH3TXD_A	GND	A31		SD05
12	CH3TXD_B		GND		GND
13	CH3RXD_B'		+5V		SD06
14	CH3RXD_A'		D16		GND
15	CH3TXC_A		D17	GND	SD07
16	CH3TXC_B		D18		GND
17	CH1TXD	GND	D19		SBP1
18	CH1RXD		D20		GND
19	CH1DSR		D21		CH2RXD
20	CH4RXD_B'		D22	GND	GND
21	CH4RXD_A'		D23		CH3RXC_A'
22	CH4TXC_A		GND	GND	GND
23	CH4TXC_B		D24		CH3RXC_B'
24	CH4RXC_B'	GND	D25		GND
25	CH4RXC_A'		D26		ENET_TXD+
26	CH4TXD_A		D27		GND
27	CH4TXD_B		D28	GND	ENET_TXD-
28	ENET_UTP1	GND	D29	GND	GND
29	ENET_UTP2	GND	D30	GND	ENET_RXD+
30	CH2TXD	GND	D31	GND	GND
31	GND	RESERVED	GND	RESERVED	ENET_RXD-
32	VCC	RESERVED	+5V	RESERVED	GND

Save to File...

Close Window

Drag the column guides to adjust the column widths.

Table 2.32: Sample P2 Pinout Table

Save the Pinout Table

8. To save the P0 or P2 pinout table to a text file, click the **Save to File** button. The Pinout Configurator saves the table as a comma-delimited file, in which table cells are separated by commas. You can import this table into any software application that can convert either of these formats into a table.

Tip

In Word, highlight the table text, then select Table -> Convert Text to Table.

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Defining New PMC Modules

The Pinout Configurator lets you add pinout configurations for additional PMC modules not included on the CD-ROM. Follow these steps to define a new PMC module:

1. Click the **Define New Module** button on the main window.

   The Define a New PMC Module window appears, as shown in Figure 2.33:

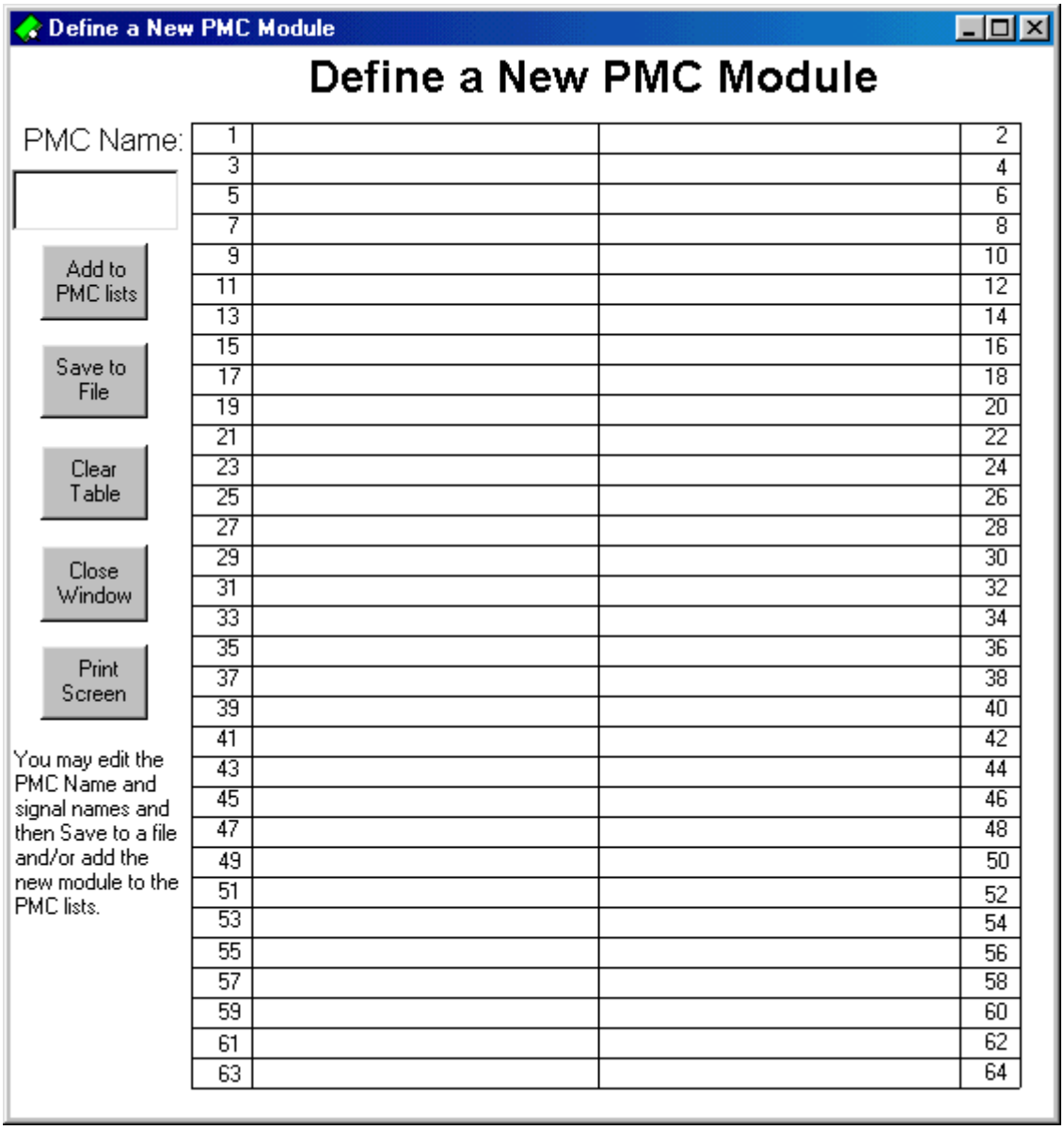

Table 2.33: Define a New PMC Module Window

2. Enter a name for the module.
3. Enter the signal name for each pin in the text box corresponding to that pin.
4. If you want to save the module for future use, click the **Save to File** button.

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5. To use the new PMC module definition, click the **Add to PMC lists** button.

You can also create a module definition by using any text editor and saving it with a *.txt* extension. The PMC module definition file is a plain text file. The first line of text is the module name. Each subsequent line of text is one signal name, starting at pin 1.

Loading PMC Module Definitions

To load a previously saved PMC module definition file, follow these steps:

1. Click the **Load PMC Def'n File** button on the Pinout Configurator main window.
2. Choose the text file containing the PMC module definition from the Open dialog box, then click **Open**.
3. To use the loaded PMC module definition, click the **Add to PMC lists** button.

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Chapter 3
Programming Interface

In this chapter...

This chapter contains the following information:

- ❏ PowerPC address mapping
- ❏ content and format of SVME/DMV-179 registers
- ❏ VMEbus addressing

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Address Maps

The PowerPC address map is fully programmable. A possible configuration for the memory map using 64-Mbit SDRAM devices and three 16-Mbyte Flash banks (i.e. a fully populated card) is shown in Table 3.1.

In this configuration, the support device I/O base address is defined to be F400 0000.

Cross Reference

Consult your Programmer's Reference to verify that this is the correct address map for your configuration.

Table 3.1: PowerPC Address Map

CPU Address Range	PCI Address Range	Definition	Size	Select
0000 0000 - 03FF FFFF	0000 0000 - 03FF FFFF	Local SDRAM Bank 0	64 Mbytes	SCS[0]
0400 0000 – 07FF FFFF	0400 0000 – 07FF FFFF	Local SDRAM Bank 1	64 Mbytes	SCS[1]
0800 0000 - 3FFF FFFF	0800 0000 - 3FFF FFFF	Reserved for SDRAM Expansion	1 Gbyte – 128 Mbyte	
4000 0000 - 9FFF FFFF	4000 0000 - 9FFF FFFF	VME Space	1.5 Gbytes	
A000 0000 – DFFF FFFF	A000 0000 – DFFF FFFF	PCI Memory Space	1 Gbyte	
E000 0000 – EFFF FFFF	E000 0000 – EFFF FFFF	PCI I/O Access	256 Mbytes	
F000 0000 – F3FF FFFF	F000 0000 – F3FF FFFF	Internal Registers	16 Mbytes	
F400 0000 – F7FF FFFF	No PCI Cycle	Support Device I/O	64 Mbytes	CS[0]*
F800 0000 – FCFF FFFF	No PCI Cycle	Reserved for Flash Expansion	80 Mbytes	
FD00 0000 – FDFF FFFF	No PCI Cycle	64-bit Flash Memory	16 Mbytes	CS[1]*
FE00 0000 – FEFF FFFF	No PCI Cycle	64-bit Flash Memory	16 Mbytes	CS[2]*
FF00 0000 – FFFF FFFF	No PCI Cycle	64-bit Flash Memory	16 Mbytes	CS[3]*/BootCS* (See Note)

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Note

The SVME/DMV-179 includes a 64-bit Flash bank, a permanently mounted alternate boot site, and a "debug Flash bank". You may boot the SVME/DMV-179 from any of these three sources. Normally, the SVME/DMV-179 boots from 64-bit Flash. However, if the Foundation Firmware in the 64-bit Flash is corrupted, you may boot from the permanent alternate boot site. In the case where both the 64-bit Flash and the permanent alternate boot site are corrupted, you may boot from the "debug Flash bank". Once you have booted the card you may use FlashProg or NVMP to reprogram the 64-bit Flash. You can then power off the card and the remove the jumper to allow local booting.

When the card boots from an alternate boot device, the 512 Kbyte memory block 1 Mbyte from the top of memory is mapped to the alternate boot device and the rest of the memory block is mapped to the 64-bit Flash (enabled by CS[3]*). The initial jump address is located in the alternate boot device.

Cross Reference

Chapter 2 of the *Getting Started Manual* describes in detail how to boot from an alternate boot device.

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Table 3.2 illustrates the memory map for the SVME/DMV-179 devices. For the memory configuration shown on page 3-3, the base address is defined to be F400 0000.

Table 3.2: Support Device Memory Map

Address	Physical Register Size	Logical Register Size	Access	Description
Base + 3F8	8	8	R/W	RS-232 Serial Channel 0 Base
Base + 2F8	8	8	R/W	RS-232 Serial Channel 1 Base
Base + 1000	8	8	R/W	PCI Control and Status Register
Base + 1001	8	8	R/W	EEPROM General Control Register
Base + 1002	8	8	R/W	Miscellaneous Register
Base + 1003	8	8	R/W	Support Device Interrupt Register
Base + 1004	8	8	R/W	PCI Device Interrupt Register
Base +1005	8	8	R/W	Support Device Interrupt Mapping Register
Base +1006	8	8	R/W	PCI Device Interrupt Mapping Register
Base +1007	8	8	R/O	PLD Version Register
Base + 1008	8	8	R/W	Timer 0 Count Register
Base + 1009	8	8	R/W	Timer 1 Count Register
Base + 100A	8	8	R/W	Timer 2 Count Register
Base + 100B	8	8	R/W	Timer Control Register 0
Base + 100C	8	8	R/W	Timer Control Register 1
Base + 1030	8	16	R/W	Discrete Digital I/O Interrupt Enable Register
Base +1032	8	16	R/W	Discrete Digital I/O Interrupt Status Register
Base +1034	8	16	R/W	Discrete Digital I/O Direction Register
Base +1036	8	16	R/W	Discrete Digital I/O Data Register
Base +1038	8	16	R/W	Discrete Digital I/O Interrupt Edge Register
Base + 103A	8	8	R/W	Support Device Interrupt Mask Register
Base + 103B	8	8	R/W	Support Device Interrupt Disable Register
Base + 103C	8	8	R/W	PCI Device Interrupt Mask Register
Base + 103D	8	8	R/W	PCI Device Interrupt Disable Register
Base +1040	8	32	R/W	Watchdog Register
Base + 2000	8	8	R/W	ESCC
Base + 3000	8	8	R/W	Real Time Clock Base
Base + 8000	8	8	R/W	NOVRAM Base

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PCI Configuration

When the SVME/DMV-179 is powered up, part of the card initialization process is to scan the PCI bus, determine what PCI devices exist, and determine their configuration requirements. This process is called probing the PCI bus. In order to support this process, all PCI devices implement a set of configuration registers. The configuration software reads a subset of a device's configuration registers in order to determine the presence of the device and its type. Having determined the presence of a device, the software then accesses the device's other configuration registers to determine how much memory and/or I/O space the device requires. The initialization software then programs the device's memory and/or I/O address decoders to respond to a unique address range.

Mandatory configuration registers for every PCI device include:

- Vendor ID Register
- Device ID Register
- Command Register
- Status Register
- Revision ID Register
- Class Code Register
- Header Type Register

The Command Register informs the initialization software whether a particular device resides in memory or I/O space.

The upper address lines are not used during the address phase of a type zero configuration access, and so are used as IDSEL lines to the various PCI devices on the card. Each of these address lines connect to the IDSEL input of a separate physical PCI package. The use of a separate line allows unique identification of a particular PCI device during configuration accesses.

Note

The SVME/DMV-179 does not support direct access to PCI configuration space.

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Table 3.3 illustrates the PCI Device IDSEL Map.

Table 3.3: PCI Device IDSEL Map

IDSEL Line	Configuration Device	Device
AD[16]	PCI-VME	Universe IID
AD[17]	Not Used	Not Used
AD[18]	PCI-SCSI/Ethernet	SYM53C885
AD[19]	System Controller	GT-64130 (Terrano)
AD[20]	PMC Slot 2	(PMC in slot 2)
AD[21]	PMC Slot 1	(PMC in slot 1)

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Register Definitions

PMC Control and Status Register

Table 3.4 shows the bits provided in the PMC Control and Status Register. This 8-bit register is accessible at address Support Device I/O Base + 1000.

Table 3.4: PMC Control and Status Register

Address: Support Device I/O Base + 1000							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0 (LSB)**
Not Used	SW0	PMC_INT	CPU_INT	Not Used	WHOAMI	PRSNT2#	PRSNT1#

Bit No.	Bit Name	Access	@Reset	Description
0	PRSNT1#	R/O	NA	PMC 1 Present 0 = PMC Slot 1 is occupied 1 = PMC Slot 1 is not occupied
1	PRSNT2#	R/O	NA	PMC 2 Present 0 = PMC Slot 2 is occupied 1 = PMC Slot 2 is not occupied
2	WHOAMI	R/O	N/A	CPU location indicator 0 = CPU is on the base card 1 = CPU is on the PMC-179
3	Not Used	R/O	0	
4	CPU_INT	R/W	0	Generate base card interrupt 0 = Interrupt is negated 1 = Interrupt is asserted
5	PMC_INT	R/W	0	Generate PMC interrupt 0 = Interrupt is negated 1 = Interrupt is asserted
6	SW0	R/O	NA	Configurable Link 0 0 = Link is installed 1 = Link is not installed
7	Not Used	R/O	0	

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PCI Device Interrupt Mask Register

Table 3.5 shows the bits provided in the PCI Device Interrupt Mask Register. This 8-bit register is accessible at address Support Device I/O Base + 103C. When an interrupt is masked, it is prevented from generating an interrupt to the CPU, however its status is not masked in the PCI Device Interrupt Status Register.

Table 3.5: PCI Device Interrupt Mask Register

Address: Support Device I/O Base + 103C							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0 (LSB)**
Not Used	PCI_INT	BRIDGE	SCSI	ETHERNET	VME	PMC 2	PMC 1

Bit No.	Bit Name	Access	@Reset	Description
0	PMC 1	R/W	0	PMC 1 Interrupt 0 = PMC 1 interrupt is not masked 1 = PMC 1 interrupt is masked
1	PMC 2	R/W	0	PMC 2 Interrupt 0 = PMC 2 interrupt is not masked 1 = PMC 2 interrupt is masked
2	VME	R/W	0	VME Interrupt 0 = VME interrupt is not masked 1 = VME interrupt is masked
3	ETHERNET	R/W	0	Ethernet Interrupt 0 = Ethernet interrupt is not masked 1 = Ethernet interrupt is masked
4	SCSI	R/W	0	SCSI Interrupt 0 = SCSI interrupt is not masked 1 = SCSI interrupt is masked
5	BRIDGE	R/W	0	Bridge Interrupt 0 = Bridge interrupt is not masked 1 = Bridge interrupt is masked
6	PCI_INT	R/W	0	PCI Interrupt 0 = PCI interrupt is not masked 1 = PCI interrupt is masked
7	Not Used	R/O	0	

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PCI Device Interrupt Disable Register

Table 3.6 shows the bits provided in the PCI Device Interrupt Disable Register. This 8-bit register is accessible at address Support Device I/O Base + 103D. When an interrupt is disabled, it is prevented from generating an interrupt to the CPU, however its status is not masked in the PCI Device Interrupt Status Register.

Table 3.6: PCI Device Interrupt Disable Register

Address: Support Device I/O Base + 103D							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0 (LSB)**
Not Used	PCI_INT	BRIDGE	SCSI	ETHERNET	VME	PMC 2	PMC 1

Bit No.	Bit Name	Access	@Reset	Description
0	PMC 1	R/W	0	PMC 1 Interrupt 0 = PMC 1 interrupt is enabled 1 = PMC 1 interrupt is disabled
1	PMC 2	R/W	0	PMC 2 Interrupt 0 = PMC 2 interrupt is enabled 1 = PMC 2 interrupt is disabled
2	VME	R/W	0	VME Interrupt 0 = VME interrupt is enabled 1 = VME interrupt is disabled
3	ETHERNET	R/W	0	Ethernet Interrupt 0 = Ethernet interrupt is enabled 1 = Ethernet interrupt is disabled
4	SCSI	R/W	0	SCSI Interrupt 0 = SCSI interrupt is enabled 1 = SCSI interrupt is disabled
5	BRIDGE	R/W	0	Bridge Interrupt 0 = Bridge interrupt is enabled 1 = Bridge interrupt is disabled
6	PCI_INT	R/W	0	PCI Interrupt 0 = PCI interrupt is enabled 1 = PCI interrupt is disabled
7	Not Used	R/O	0	

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EEPROM General Control Register

Table 3.7 shows the bits provided in the EEPROM General Control Register. This 8-bit register is accessible at address Support Device I/O Base + 1001.

Table 3.7: EEPROM General Control Register

Address: Support Device I/O Base + 1001							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0 (LSB)**
EE_SDI	EE_SDO	EE_CS	EE_CLK	STAT_LED	SCSI_PD	Not Used	BOOT_WP

Bit No.	Bit Name	Access	@Reset	Description
0	BOOT_WP	R/W	1	BOOT Flash Write Protect 0 = Enable WE- signal to the FLASH 1 = Disable WE- signal to the FLASH
1	Not Used	R/O	0	
2	SCSI_PD	R/W	0	SCSI Termination Power Down 0 = SCSI terminations are powered down 1 = SCSI terminations are powered up
3	STAT_LED	R/W	0	Status LED 0 = Status LED is on 1 = Status LED is off
4	EE_CLK	R/W	0	Serial EEPROM Clock Control 0 = Serial EEPROM Clock negated 1 = Serial EEPROM Clock asserted
5	EE_CS	R/W	0	Serial EEPROM Chip Select 0 = Serial EEPROM enabled 1 = Serial EEPROM disabled
6	EE_SDO	R/O	NA	Serial EEPROM Data Output 0 = Serial EEPROM low 1 = Serial EEPROM high
7	EE_SDI	R/W	0	Serial EEPROM Data Input 0 = Serial EEPROM low 1 = Serial EEPROM high

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Miscellaneous Control Register

Table 3.8 shows the bits provided in the Miscellaneous Control Register. This 8-bit register is accessible at Support Device I/O Base + 1002.

Table 3.8: Miscellaneous Control Register

Address: Support Device I/O Base + 1002							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0 (LSB)**
NVRAM_WP	ALT_BOOT	APP_WP	BOOT_8BIT	CLR_MCP	ECC_CLKE	VIRQ1_ON	885_RST

Bit No.	Bit Name	Access	@Reset	Description
0	885_RST	R/W	1	Ethernet/SCSI Reset 0 = Ethernet/SCSI device is not in reset 1 = Ethernet/SCSI device is held in reset
1	VIRQ1_ON (Note 1)	R/W	0	VME IRQ1 control 0 = Universe IID controls VME IRQ1 assertion 1 = Force VMEbus IRQ1 active.
2	ECC_CLKE	R/W	1	ECC SDRAM Clock Enable 0 = ECC SDRAM Clock is disabled 1 = ECC SDRAM Clock is enabled
3	CLR_MCP (Note 1) (Note 2)	R/W	0	Machine Check Pin Enable 0 =Disable machine check exception 1 = Enable machine check exception
4	BOOT_8BIT	R/O	N/A	BOOT PROM Select 0 = Jumper E6 - E7 is inserted. Boot from debug Flash bank (512KX8 DIP site) or permanent alternate boot site, depending on the state of ALT_BOOT. 1 = Jumper E6 - E7 is removed. Boot from 64-bit wide Flash or permanent alternate boot site.
5	APP_WP	R/W	1	Application Flash Write Protect 0 = Enable WE- signal to the Flash 1 = Disable WE- signal to the Flash
6	ALT_BOOT	R/O	N/A	8-Bit Boot Device Select 0 = P0-A10 is grounded or E48 - E49 is inserted, selecting the permanent alternate boot site. 1 = P0-A10 is disconnected and E48 - E49 is not inserted, selecting the 64-bit Flash or the debug Flash bank, depending on the state of BOOT_8BIT
7	NVRAM_WP	R/W	0	NVRAM Write Protect 0 = Enable WE- signal to NVRAM 1= Disable WE- signal to NVRAM

1. This functionality is not present in older FPGAs.
2. When CLR_MCP = 1, once SERR# is asserted, CPU_MCP- will be latched to logic LOW until CLR_MCP is cleared. The processor should clear CLR_MCP in order to receive subsequent CPU_MCP-.

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Support Device Interrupt Status Register

Table 3.9 shows the bits provided in the Support Device Interrupt Status Register. This 8-bit register is accessible at address Support Device I/O Base + 1003.

Table 3.9: Support Device Interrupt Status Register

Address: Support Device I/O Base + 1003							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0 (LSB)**
Not Used	TMR_INT	WD_INT	PIO_INT	SCC_INT	RTC_INT	UART1_INT	UART0_INT

Bit No.	Bit Name	Access	@Reset	Description
0	UART0_INT	R/O	NA	DUART 0 Interrupt 0 = DUART 0 interrupt is not asserted 1 = DUART 0 interrupt is asserted
1	UART1_INT	R/O	NA	DUART 1 Interrupt 0 = DUART 1 interrupt is not asserted 1 = DUART 1 interrupt is asserted
2	RTC_INT	R/O	NA	RTC Interrupt 0 = RTC interrupt is not asserted 1 = RTC interrupt is asserted
3	SCC_INT	R/O	NA	SCC Interrupt 0 = SCC interrupt is not asserted 1 = SCC interrupt is asserted
4	PIO_INT (Note 1)	R/O	0	Discrete Digital I/O Interrupt Detected 0 = Discrete Digital I/O interrupt is not asserted 1 = Discrete Digital I/O interrupt is asserted
5	WD_INT	R/O	NA	Watchdog Interrupt 0 = Watchdog interrupt is not asserted 1 = Watchdog interrupt is asserted
6	TMR_INT (Note 2)	R/O	NA	Timer Interrupt 0 = 16-bit Timer interrupt is not asserted 1 = 16-bit Timer interrupt is asserted
7	Not Used	R/O	0	

Note

1. This bit will be asserted if any Discrete Digital I/O interrupt is asserted.
2. An interrupt is asserted if any enabled 16-bit timer interrupt is asserted.

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Support Device Interrupt Mask Register

Table 3.10 shows the bits provided in the Support Device Interrupt Mask Register. This 8-bit register is accessible at address Support Device I/O Base + 103A. When an interrupt is masked it is prevented from generating an interrupt to the CPU, however its status is not masked in the Support Device Interrupt Status Register.

Table 3.10: Support Device Interrupt Mask Register

Address: Support Device I/O Base + 103A							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0 (LSB)**
Not Used	TMR_INT	WD_INT	PIO_INT	SCC_INT	RTC_INT	UART1_INT	UART0_INT

Bit No.	Bit Name	Access	@Reset	Description
0	DUART 0	R/W	NA	DUART 0 Interrupt 0 = DUART 0 interrupt is not masked 1 = DUART 0 interrupt is masked
1	DUART 1	R/W	NA	DUART 1 Interrupt 0 = DUART 1 interrupt is not masked 1 = DUART 1 interrupt is masked
2	RTC_INT	R/W	NA	RTC Interrupt 0 = RTC interrupt is not masked 1 = RTC interrupt is masked
3	SCC_INT	R/W	NA	SCC Interrupt 0 = SCC interrupt is not masked 1 = SCC interrupt is masked
4	PIO_INT	R/W	0	Discrete Digital I/O Interrupt Detected 0 = Discrete Digital I/O interrupt is not masked 1 = Discrete Digital I/O interrupt is masked
5	WD_INT	R/W	NA	Watchdog Interrupt 0 = Watchdog interrupt is not masked 1 = Watchdog interrupt is masked
6	TMR_INT	R/W	NA	Timer Interrupt 0 = 16-bit Timer interrupt is not masked 1 = 16-bit Timer interrupt is masked
7	Not Used	R/O	0	

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Support Device Interrupt Disable Register

Table 3.11 shows the bits provided in the Support Device Interrupt Disable Register. This 8-bit register is accessible at address Support Device I/O Base + 103B. When an interrupt is disabled it is prevented from generating an interrupt to the CPU, however its status is not masked in the Support Device Interrupt Status Register.

Table 3.11: Support Device Interrupt Disable Register

Address: Support Device I/O Base + 103B							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0 (LSB)**
Not Used	TMR_INT	WD_INT	PIO_INT	SCC_INT	RTC_INT	UART1_INT	UART0_INT

Bit No.	Bit Name	Access	@Reset	Description
0	DUART 0	R/W	NA	DUART 0 Interrupt 0 = DUART 0 interrupt is enabled 1 = DUART 0 interrupt is disabled
1	DUART 1	R/W	NA	DUART 1 Interrupt 0 = DUART 1 interrupt is enabled 1 = DUART 1 interrupt is disabled
2	RTC_INT	R/W	NA	RTC Interrupt 0 = RTC interrupt is enabled 1 = RTC interrupt is disabled
3	SCC_INT	R/W	NA	SCC Interrupt 0 = SCC interrupt is enabled 1 = SCC interrupt is disabled
4	PIO_INT	R/W	0	Discrete Digital I/O Interrupt Detected 0 = Discrete Digital I/O interrupt is enabled 1 = Discrete Digital I/O interrupt is disabled
5	WD_INT	R/W	NA	Watchdog Interrupt 0 = Watchdog interrupt is enabled 1 = Watchdog interrupt is disabled
6	TMR_INT	R/W	NA	Timer Interrupt 0 = 16-bit Timer interrupt is enabled 1 = 16-bit Timer interrupt is disabled
7	Not Used	R/W	0	

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PCI Device Interrupt Status Register

Table 3.12 shows the bits provided in the PCI Device Interrupt Status Register. This 8-bit register is accessible at address Support Device I/O Base + 1004.

Table 3.12: PCI Device Interrupt Status Register

Address: Support Device I/O Base + 1004							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0 (LSB)**
Not Used	PCI_INT	BRIDGE	SCSI	ETHERNET	VME	PMC 2	PMC 1

Bit No.	Bit Name	Access	@Reset	Description
0	PMC 1	R/O	NA	PMC 1 Interrupt 0 = PMC 1 interrupt is not asserted 1 = PMC 1 interrupt is asserted
1	PMC 2	R/O	NA	PMC 2 Interrupt 0 = PMC 2 interrupt is not asserted 1 = PMC 2 interrupt is asserted
2	VME	R/O	NA	VME Interrupt 0 = VME interrupt is not asserted 1 = VME interrupt is asserted
3	ETHERNET	R/O	NA	Ethernet Interrupt 0 = Ethernet interrupt is not asserted 1 = Ethernet interrupt is asserted.
4	SCSI	R/O	NA	SCSI Interrupt 0 = SCSI interrupt is not asserted 1 = SCSI interrupt is asserted
5	BRIDGE	R/O	NA	CPU PCI Bridge Interrupt 0 = CPU PCI bridge interrupt is not asserted 1 = CPU PCI bridge interrupt is asserted
6	PCI_INT	R/O	NA	PCI Bridge PCI Interrupt 0 = CPU PCI bridge PCI interrupt is not asserted 1 = CPU PCI bridge PCI interrupt is asserted
7	Not Used	R/O	NA	

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Support Device Interrupt Mapping Register

Table 3.13 shows the bits provided in the Support Device Interrupt Mapping Register. This 8-bit register is accessible at Support Device I/O Base + 1005.

In the Description section of the table below, “basecard interrupt” means the main CPU interrupt signal and “PMC card interrupt” represents an auxilliary interrupt signal that can be routed to a PMC site. The auxilliary interrupt signal is referenced as PMC_INT on the SVME/DMV-179 schematics.

Table 3.13: Support Device Interrupt Mapping Register

Address: Support Device I/O Base + 1005							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0 (LSB)**
Not Used	TMR_INT	WD_INT	PIO	SCC	RTC	DUART1	DUART0

Bit No.	Bit Name	Access	@Reset	Description
0	DUART 0	R/W	0	DUART 0 Interrupt 0 = DUART 0 interrupt generates basecard interrupt 1 = DUART 0 interrupt generates PMC card interrupt
1	DUART 1	R/W	0	DUART 1 Interrupt 0 = DUART 1 interrupt generates basecard interrupt 1 = DUART 1 interrupt generates PMC card interrupt
2	RTC	R/W	0	RTC Interrupt 0 = RTC interrupt generates basecard interrupt 1 = RTC interrupt generates PMC card interrupt
3	SCC	R/W	0	SCC Interrupt 0 = SCC interrupt generates basecard interrupt 1 = SCC interrupt generates PMC card interrupt
4	PIO (Note 1)	R/W	0	Discrete Digital I/O Interrupt Detected 0 = Discrete Digital I/O interrupt generates basecard interrupt 1 = Discrete Digital I/O interrupt generates PMC card interrupt
5	WD_INT	R/W	0	Watchdog Interrupt 0 = Watchdog interrupt generates basecard interrupt 1 = Watchdog interrupt generates PMC card interrupt
6	TMR_INT (Note 2)	R/W	0	Timer Interrupt 0 = 16-bit Timer interrupt generates basecard interrupt 1 = 16-bit Timer interrupt generates PMC card interrupt
7	Not Used	R/O	0	

Note

1. An interrupt is asserted if any Discrete Digital I/O interrupt is asserted.
2. An interrupt is asserted if any enabled 16-bit timer interrupt is asserted.

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PCI Device Interrupt Mapping Register

Table 3.14 shows the bits provided in the PMC Device Interrupt Mapping Register. This 8-bit register is accessible at Support Device I/O Base + 1006.

Table 3.14: PCI Device Interrupt Mapping Register

Address: Support Device I/O Base + 1006							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0 (LSB)**
Not Used	PCI_INT	BRIDGE	SCSI	ETHERNET	VME	PMC 2	PMC 1

Bit No.	Bit Name	Access	@Reset	Description
0	PMC 1	R/W	0	PMC 1 Interrupt 0 = PMC 1 interrupt causes basecard interrupt 1 = PMC 1 interrupt causes PMC card interrupt
1	PMC 2	R/W	0	PMC 2 Interrupt 0 = PMC 2 interrupt causes basecard interrupt 1 = PMC 2 interrupt causes PMC card interrupt
2	VME	R/W	0	VME Interrupt 0 = VME interrupt causes basecard interrupt 1 = VME interrupt causes PMC card interrupt
3	ETHERNET	R/W	0	Ethernet Interrupt 0 = Ethernet interrupt causes basecard interrupt 1 = Ethernet interrupt causes PMC card interrupt
4	SCSI	R/W	0	SCSI Interrupt 0 = SCSI interrupt causes basecard interrupt 1 = SCSI interrupt causes PMC card interrupt
5	BRIDGE	R/W	0	CPU PCI Bridge Interrupt 0 = CPU PCI bridge interrupt causes basecard interrupt 1 = CPU PCI bridge interrupt causes PMC card interrupt
6	PCI_INT	R/W	0	PCI Bridge PCI Interrupt 0 = CPU PCI bridge PCI interrupt causes basecard interrupt 1 = CPU PCI bridge PCI interrupt causes PMC card interrupt
7	Not Used	R/O	0	

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PLD Version Register

Table 3.15 shows the bits provided in the PLD Version register. This 8-bit register is accessible at Support Device I/O Base + 1007.

Table 3.15: PLD Version Register

Address: Support Device I/O Base + 1007
7:0
PLD_VERS

Bit No.	Bit Name	Access	@Reset	Description
7:0	PLD_VERS	R/O (Note 1)	NA	Current PLD S/W Revision

Note 1: While this register is read only, a write attempt to the register's address does have an effect. Attempting to write to this register will reload the intial watchdog timer timeout value.

Timer Count Registers

The SVME/DMV-179 provides three 16-bit presettable/cascadeable/readable count down timers with a resolution of 1 us. Each timer is capable of being selected to provide an interrupt to the basecard on timeout. Three 8-bit registers are provided to load the initial count value by write operation and read back the current count value by read operation. The timer count registers are shown in Tables 3.16 through 3.18.

When writing to these 8-bit registers, the first write will program the timer initial count LSB, the second write will program the timer initial count MSB. **Before a read/write operation, write a 0 to TMR_CLR (TCR1[5]). Read operation must reflect the timer configuration, and the first read must start from the LSB**. For example, for 32-bit timer configuration with timer1 cascaded to timer2, the read sequence should be: T1CR-T1CR-T2CR-T2CR, with the read back value corresponding to TC[7:0], TC[15:8], TC[23:15] and TC[31:16]. For 48-bit configuration, six consecutive reads should be issued for the read operation with the read sequence as: T0CR-T0CR-T1CR-T1CR-T2CR-T2CR. Timer configuration information is contained in Timer Control Register 0 (TCR0). The read/write sequence can be cleared at any time by writing 0 to Timer Control Register 1 bit 5 (TCR1[5]).

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Table 3.16: Timer 0 Counter Register (T0CR)

Address: Support Device I/O Base + 1008
7:0
T0CR

Bit No.	Bit Name	Access	@Reset	Description
7-0	TC[15:0]	R/W	0xffff	Timer 0 count value

Table 3.17: Timer 1 Counter Register (T1CR)

Address: Support Device I/O Base + 1009
7:0
T1CR

Bit No.	Bit Name	Access	@Reset	Description
7-0	TC[15:0]	R/W	0xffff	Timer 1 count value

Table 3.18: Timer 2 Counter Register (T2CR)

Address: Support Device I/O Base + 100A
7:0
T2CR

Bit No.	Bit Name	Access	@Reset	Description
7-0	TC[15:0]	R/W	0xffff	Timer 2 count value

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Timer Control Register 0 (TCR0)

Table 3.19 shows the bits provided in the Timer Control Register 0.

Table 3.19: Timer Control Register 0

Address: Support Device I/O Base + 100B							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
TMR2INTEN	TMR1INTEN	TMR0INTEN	TMR2CLK	TMR1CLK	TMR2EN	TMR1EN	TMR0EN

Bit No.	Bit Name	Access	@Reset	Description
0	TMR0EN	R/W	0	Timer 0 Enable 0 = Timer 0 is disabled 1 = Timer 0 is enabled
1	TMR1EN	R/W	0	Timer 1 Enable 0 = Timer 1 is disabled 1 = Timer 1 is enabled
2	TMR2EN	R/W	0	Timer 2 Enable 0 = Timer 2 is disabled 1 = Timer 2 is enabled
3	TMR1CLK	R/W	0	Timer 1 Clock 0 = Timer 1 decrements at the 1MHz interval 1 = Timer 1 decrements at timer 0 terminal count
4	TMR2CLK	R/W	0	Timer 2 Clock 0 = Timer 2 decrements at the 1MHz interval 1 = Timer 2 decrements at timer 1 terminal count
5	TMR0INTEN	R/W	0	Timer 0 Interrupt 0 = Clear Timer 0 Interrupt 1 = Enable Timer 0 Interrupt
6	TMR1INTEN	R/W	0	Timer 1 Interrupt 0 = Clear Timer 1 Interrupt 1 = Enable Timer 1 Interrupt
7	TMR2INTEN	R/W	0	Timer 2 Interrupt 0 = Clear Timer 2 Interrupt 1 = Enable Timer 2 Interrupt

Caution

Whenever the timer is restarted by TMR_EN = 0-1, it will automatically reload the initial value. **For safe operation, configure timer clocks before enabling the timers, and disable the timers before reconfiguring timer clocks. Failure to do so may generate spurious interrupts.**

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Timer Control Register 1 (TCR1)

Table 3.20 shows the bits provided in the Timer Control Register 1.

Table 3.20: Timer Control Register 1 (TCR1)

Address: Support Device I/O Base + 100C							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Not Used	Not Used	TMR_CLR	INTSEL1	INTSEL0	TMR2INT	TMR1INT	TMR0INT

Bit No.	Bit Name	Access	@Reset	Description
0	TMR0INT	R/O	1	Timer 0 Interrupt Status 0 = Timer 0 Interrupt is active 1 = Timer 0 Interrupt is inactive
1	TMR1INT	R/O	1	Timer 1 Interrupt Status 0 = Timer 1 Interrupt is active 1 = Timer 1 Interrupt is inactive
2	TMR2INT	R/O	1	Timer 2 Interrupt Status 0 = Timer 2 Interrupt is active 1 = Timer 2 Interrupt is inactive
3	INTSEL0	R/W	1	Timer Interrupt Select (INTSEL1, INTSEL0) 00: Timer 0 Interrupt generates external interrupt 01: Timer 1 Interrupt generates external interrupt 10: Timer 2 Interrupt generates external interrupt 11: Timer 0 or 1 or 2 generates external interrupt
4	INTSEL1 (See Note)	R/W	1	
5	TMR_CLR	W/O	1	Timer Read/Write Sequence Clear 0 = Clear the timer count read/write sequence 1 = No effect
6	Not Used	R/O	0	
7	Not Used	R/O	0	

Note

When INTSEL = 11 is selected, the timeout interrupt will reflect the timer configuration. For example, when Timer 0 is cascaded to Timer 1, only Timer 1 and Timer 2 generate external interrupts provided the INTEN bits are enabled. For a 48-bit timer configuration, only Timer 2 generates an external interrupt.

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Discrete Digital I/O

The discrete digital I/O function of the SVME/DMV-179 is implemented in the FPGA. It provides 12 configurable Discrete Digital I/O lines. Each I/O line is configurable through software to operate as an input or output.

Each I/O line may also generate an interrupt on either a rising or falling edge. Inputs provide adequate filtering to prevent spurious interrupts from being generated. Pull-up resistors are used on all I/O signals.

Discrete Digital I/O Data Register

Table 3.21 shows the bits provided in the Discrete Digital I/O Data Register. This 16-bit register is accessible at Support Device I/O Base + 1036. It provides individual control for each of the 12 discrete digital I/O lines.

Table 3.21: Discrete Digital I/O Data Register

Address: Support Device I/O Base + 1036							
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**
0	0	0	0	PDAT(11)	PDAT(10)	PDAT(9)	PDAT(8)

7	**6**	**5**	**4**	**3**	**2**	**1**	**0 (LSB)**
PDAT(7)	PDAT(6)	PDAT(5)	PDAT(4)	PDAT(3)	PDAT(2)	PDAT(1)	PDAT(0)

Bit No.	Bit Name	Access	@Reset	Description
11:0	PDAT(11:0)	R/W	0	Discrete Digital I/O Data Write 0 = If configured for output PIO signal is driven low 1 = If configured for output PIO signal is driven high Read Returns the logic state of the discrete digital I/O pin.
15:12	Not Used	R/O	0	

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Discrete Digital I/O Direction Register

Table 3.22 shows the bits provided in the Discrete Digital I/O Direction Register. This 16-bit register is accessible at Support Device I/O Base + 1034.

Table 3.22: Discrete Digital I/O Direction Register

Address: Support Device I/O Base + 1034							
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**
0	0	0	0	PDIR(11)	PDIR(10)	PDIR(9)	PDIR(8)

7	**6**	**5**	**4**	**3**	**2**	**1**	**0 (LSB)**
PDIR(7)	PDIR(6)	PDIR(5)	PDIR(4)	PDIR(3)	PDIR(2)	PDIR(1)	PDIR(0)

Bit No.	Bit Name	Access	@Reset	Description
11:0	PDIR(15:0)	R/W	0	Discrete Digital I/O Direction Control 0 = Input 1 = Output
15:12	Not Used	R/O	0	

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Discrete Digital I/O Interrupt Enable Register

Table 3.23 shows the bits provided in the Discrete Digital I/O Interrupt Enable Register. This 16-bit register is accessible at Support Device I/O Base + 1030. It provides individual interrupt enabling for each of the 16 discrete digital I/O lines.

Table 3.23: Discrete Digital I/O Interrupt Enable Register

Address: Support Device I/O Base + 1030							
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**
0	0	0	0	PIEN(11)	PIEN(10)	PIEN(9)	PIEN(8)

7	**6**	**5**	**4**	**3**	**2**	**1**	**0 (LSB)**
PIEN(7)	PIEN(6)	PIEN(5)	PIEN(4)	PIEN(3)	PIEN(2)	PIEN(1)	PIEN(0)

Bit No.	Bit Name	Access	@Reset	Description
11:0	PIEN(11:0)	R/W	0	Discrete Digital I/O Interrupt Enable 0 = Interrupt is disabled 1 = Interrupt is enabled
15:12	Not Used	R/O	0	

Note

One interrupt enable exists for each Discrete Digital I/O signal.

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Discrete Digital I/O Interrupt Status Register

Table 3.24 shows the bits provided in the Discrete Digital I/O Interrupt Status Register. This 16-bit register is accessible at Support Device I/O Base + 1032.

Table 3.24: Discrete Digital I/O Interrupt Status Register

Address: Support Device I/O Base + 1032							
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**
0	0	0	0	PINT(11)	PINT(10)	PINT(9)	PINT(8)

7	**6**	**5**	**4**	**3**	**2**	**1**	**0 (LSB)**
PINT(7)	PINT(6)	PINT(5)	PINT(4)	PINT(3)	PINT(2)	PINT(1)	PINT(0)

Bit No.	Bit Name	Access	@Reset	Description
11:0	PINT(11:0)	R/W	0	Discrete Digital I/O Interrupt Status 0 = No interrupt has been detected 1 = Interrupt has been detected
15:12	Not Used	R/O	0	

Note

Writing a zero will clear the appropriate interrupt status bit. Writing a value of one has no effect on the interrupt status bit. The bit must clear before another interrupt is detected.

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Discrete Digital I/O Interrupt Edge Register

Table 3.25 shows the bits provided in the Discrete Digital I/O Interrupt Edge Register. This 16-bit register is accessible at Support Device I/O Base + 1038.

Table 3.25: Discrete Digital I/O Interrupt Edge Register

Address: Support Device I/O Base + 1038							
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**
0	0	0	0	PIER(11)	PIER(10)	PIER(9)	PIER(8)

7	**6**	**5**	**4**	**3**	**2**	**1**	**0 (LSB)**
PIER(7)	PIER(6)	PIER(5)	PIER(4)	PIER(3)	PIER(2)	PIER(1)	PIER(0)

Bit No.	Bit Name	Access	@Reset	Description
11:0	PIER(11:0)	R/W	0	Discrete Digital I/O Direction Control 0 = Interrupt on high to low going edge 1 = Interrupt on low to high going edge
15:12	Not Used	R/O	0	

Tip

Attempting to change an interrupt edge select with the PIO interrupt enable active will result in an interrupt. Mask the interrupt before changing the edge select.

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Watchdog

The SVME/DMV-179 provides one programmable 24-bit Watchdog Timer. The resolution of the timer is 1 microsecond. The watchdog is a down counter with terminal count detection when the count of zero is reached. When configured to generate an interrupt, the watchdog timeout value (WDOG_TO) may be updated at any time. When configured to generate a reset and the watchdog has been enabled, the timeout value may only be updated once. Subsequent writes will be ignored. The watchdog will re-load the initial timeout value when either the WDOG_RESTART bit is set, or any write operation to the PLD Version Register occurs. Data is ignored during the PLD Version Register write. Table 3.26 shows the bits in the Watchdog Register.

Table 3.26: Watchdog Register

Address: Support Device I/O Base + 1040						
31	**30**	**29**	**28:26**	**25**	**24**	**23:0**
WDEN	INT_RST	WDOG_ RESTART	Reserved	WDOG_FAIL	PWR_FAIL	WDOG_TO

Bit No.	Bit Name	Access	@Reset	Description
23:0	WDOG_TO (Note 2)	R/W (Note 3)	FFFFF	Watchdog timeout constant.
24	PWR_FAIL	R/O	N/A	Power Failure 0 = The last reset was not the result of a power failure 1 = The last reset was the result of a power failure
25	WDOG_FAIL	R/O	N/A	Watchdog Timeout Occurred Status 0 = The last reset was not the result of a watchdog timeout 1 = The last reset was the result of a watchdog timeout
28:26	Reserved	R/O	0	Reserved
29	WDOG_ RESTART	W/O	0	Watchdog Re-start 0 = No effect 1 = Causes the watchdog to reload the timeout constant
30	INT_RST	R/W	0	Watchdog Mode 0 = Watchdog generates an interrupt on timeout 1 = Watchdog generates a system reset on timeout
31	WDEN (Note 1)	R/W	0	Watchdog Enable 0 = The Watchdog is disabled 1 = The Watchdog is enabled

1. A configuration jumper is provided to invert the power up condition of INT_RST and WDEN, with the option of either {INT_RST, WDEN}=00 or {INT_RST, WDEN}=11. After power up, these two bits can be individually programmed. With INT_RST=1, WDEN cannot be disabled once it is enabled.
2. Following a power up reset the WDOG_TO is initialized to FFFFFF. For non-power up resets the initial value is the last value written to the WDOG_TO field.
3. This value can only be written once if WDEN is enabled and INT_RST generates a system reset.

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Non-Volatile Memory

The Simtek STK14C88 device provides the non-volatile memory (NOVRAM) function on the SVME/DMV-179.

SRAM Read

The SRAM within the NOVRAM can be read exactly like any normal volatile RAM. There are no special procedures required.

SRAM Write

The SRAM within the NOVRAM can be read exactly like any normal volatile RAM. There are no special procedures required.

Software STORE

Executing sequential read cycles from six specific address locations initiates the STK14C88 software STORE cycle. During the STORE cycle, an erase of the previous nonvolatile data is first performed, followed by a program cycle which copies the SRAM data into the nonvolatile elements. Once a STORE cycle is initiated, further input and output is disabled until the cycle is completed.

Note

If any other read and write cycle is processed in the middle of the sequence of six reads, the STORE operation will be aborted.

To initiate the STORE cycle, perform the read sequence in Table 3.27.

Table 3.27: NOVRAM Software STORE Algorithm

Cycle	Address (H)	Result
Read	0E38	Valid Read
Read	31C7	Valid Read
Read	03E0	Valid Read
Read	3C1F	Valid Read
Read	303F	Valid Read
Read	0FC0	Initiate STORE Cycle

After the sixth address in the sequence has been entered, the STORE cycle will commence and the device will be disabled for further accesses until the STORE operation completes. A software STORE cycle will complete within 10ms.

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Software RECALL

A RECALL cycle of the nonvolatile data into the SRAM is initiated with a sequence of read operations in a manner similar to the STORE operation. To initiate RECALL cycles, the sequence of reads given in Table 3.28 must be performed.

Table 3.28: NOVRAM Software RECALL Algorithm

Cycle	Address (H)	Result
Read	0E38	Valid Read
Read	31C7	Valid Read
Read	03E0	Valid Read
Read	3C1F	Valid Read
Read	303F	Valid Read
Read	0C63	Initiate RECALL Cycle

Internal to the STK14C88, RECALL is a two step procedure. First, the SRAM data is cleared, and second, the nonvolatile information is transferred into the SRAM. The RECALL operation does not change the data in the nonvolatile memory. A software RECALL cycle will complete within 20 µs.

AutoSTORE

If the STK14C88 NOVRAM detects that the card supply voltage is dropping below a capacitor-held value, it will perform a single STORE operation, transferring the current SRAM contents to the nonvolatile store, using the power stored in the capacitor.

Cross Reference

Refer to the manufacturer's datasheet for this device for further programming information.

Interrupt Structure

The PowerPC family of microprocessors provides two interrupts, the general purpose interrupt (INT) and the System Management Interrupt (SMI). The SVME/DMV-179 only uses INT for peripheral devices to interrupt the processor.

The SVME/DMV-179 provides a fully programmable interrupt controller, which is implemented in the FPGA. The interrupt structure is shown in Figure 3.1. Refer to "Register Definitions" on page 3-8 for detailed information.

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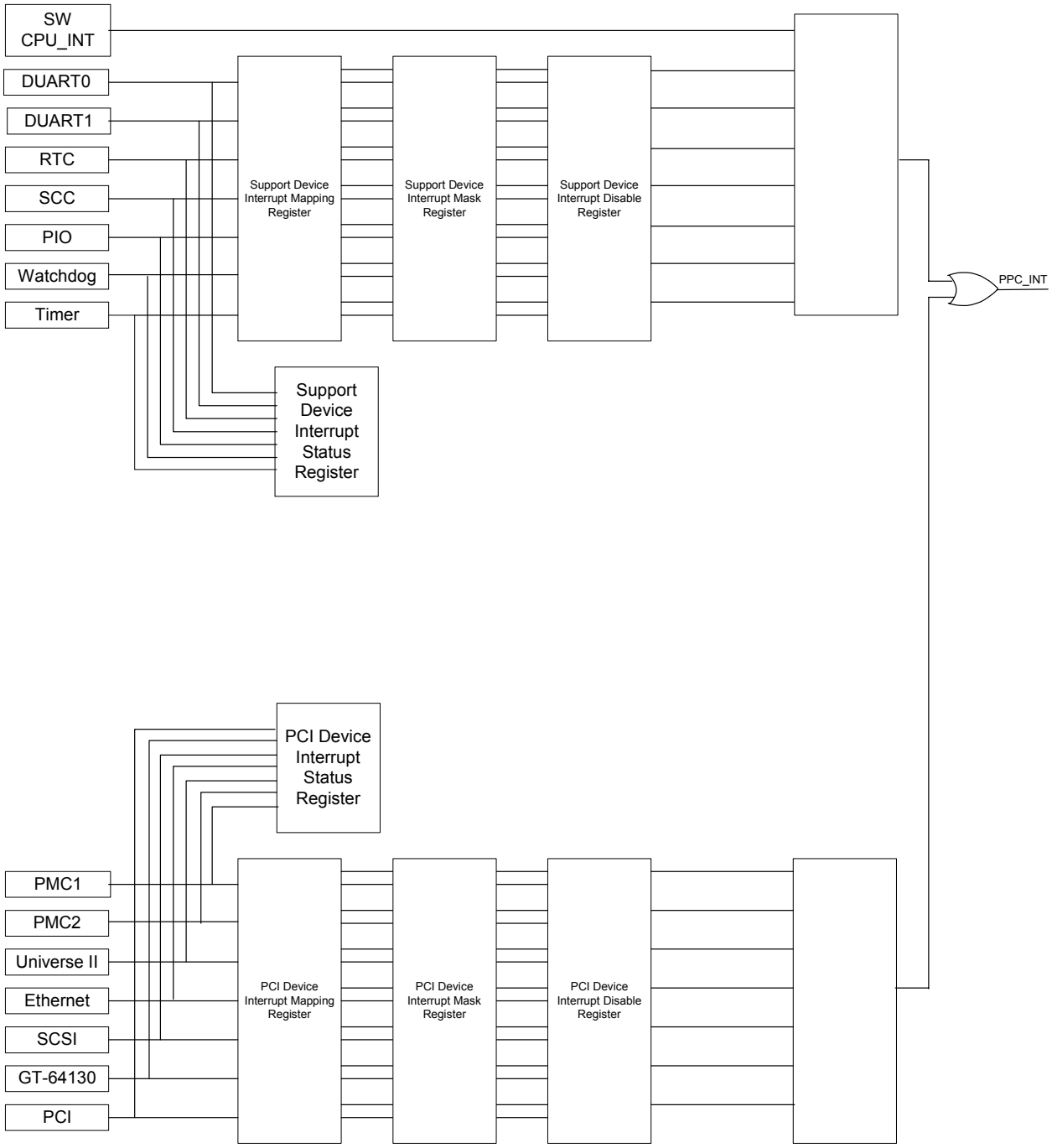

Figure 3.1 SVME/DMV-179 Interrupt Structure for Basecard CPU Interrupt

Note

SW CPU_INT is for Dy 4 use only.

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Endian Issues

The SVME/DMV-179 contains some devices which are little endian and some which are big endian.

The PowerPC processor and the VMEbus are inherently big endian, while the PCI bus is inherently little endian. The following sections summarize how the SVME/DMV-179 handles hardware and software differences between big and little endian operation.

PowerPC

The PowerPC processor can operate in both big-endian and little-endian mode. However, the processor always treats the external PowerPC bus as big endian by performing address rearrangement and reordering when running in little-endian mode.

GT-64130

Most registers in the GT-64130 bridge appear as little endian. The PCI Configuration Data Register is big endian.

PCI

The PCI bus is inherently little endian. All devices connected to the PCI bus operate in little-endian mode, regardless of the mode of operation on the PowerPC bus.

SCSI

The SCSI interface is byte-stream oriented. The byte having the lowest address in memory is the first one to be transferred regardless of the endian mode. Big-endian software must take the byte-swapping effect into account when accessing the SCSI controller registers.

Ethernet

The Ethernet interface is also byte-stream oriented. The byte having the lowest address in memory is the first one to be transferred regardless of the endian mode. Big-endian software must take the byte-swapping effect into account when accessing the registers of the Ethernet controller.

Universe IID

Because the PCI bus is little endian while the VMEbus is big endian, the Universe IID performs byte swapping in both directions (from PCI to VMEbus and from VMEbus to PCI) to maintain address invariance, regardless of the mode of operation on the PowerPC bus.

All devices connected directly to the VMEbus must operate in big-endian mode.

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VMEbus Base Address Selection

The VMEbus base address of the SVME/DMV-179 may be selected in one of two ways. The VME64 Extensions specifies six pins on the backplane (five geographical address pins and one geographical address parity pin) which may be used to specify the VME address. The Universe IID also provides a mechanism for defining the VME base address of the card.

Geographical Address Lines

The Geographical Address lines define the slot number where the SVME/DMV-179 is installed. These lines are accessible on the backplane. Table 3.29 shows the mapping between slot number and GA lines.

Table 3.29: Geographical Address Pin Assignments

Slot Number	GAP* Pin P1-D9	GA4* Pin P1-D17	GA3* Pin P1-D15	GA2* Pin P1-D13	GA1* Pin P1-D11	GA0* Pin P1-D10
1	Open	Open	Open	Open	Open	Ground
2	Open	Open	Open	Open	Ground	Open
3	Ground	Open	Open	Open	Ground	Ground
4	Open	Open	Open	Ground	Open	Open
5	Ground	Open	Open	Ground	Open	Ground
6	Ground	Open	Open	Ground	Ground	Open
7	Open	Open	Open	Ground	Ground	Ground
8	Open	Open	Ground	Open	Open	Open
9	Ground	Open	Ground	Open	Open	Ground
10	Ground	Open	Ground	Open	Ground	Open
11	Open	Open	Ground	Open	Ground	Ground
12	Ground	Open	Ground	Ground	Open	Open
13	Open	Open	Ground	Ground	Open	Ground
14	Open	Open	Ground	Ground	Ground	Open
15	Ground	Open	Ground	Ground	Ground	Ground
16	Open	Ground	Open	Open	Open	Open
17	Ground	Ground	Open	Open	Open	Ground
18	Ground	Ground	Open	Open	Ground	Open
19	Open	Ground	Open	Open	Ground	Ground
20	Ground	Ground	Open	Ground	Open	Open
21	Open	Ground	Open	Ground	Open	Ground

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Universe IID

The slave address registers in the Universe IID may define the base address of the SVME/DMV-179. These registers define the map size of the VMEbus memory map. The Base Address Register defines the start of the slave window. The Bound Address Register defines the end of the slave window. Any access to addresses above the address programmed into the Board Address Registers will result in no response from the SVME/DMV-179.

Table 3.30 identifies the base addresses. All numbers are in hexadecimal notation.

Table 3.30: VMEbus Base Addresses

Slot Number	Extended Address (A32)	Standard Address (A24)
00	Reserved	Reserved
01	4000 0000	40 0000
02	4800 0000	48 0000
03	5000 0000	50 0000
04	5800 0000	58 0000
05	6000 0000	60 0000
06	6800 0000	68 0000
07	7000 0000	70 0000
08	7800 0000	78 0000
09	8000 0000	80 0000
0A	8800 0000	88 0000
0B	9000 0000	90 0000
0C	9800 0000	98 0000

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Universe IID Registers

Cross Reference

The Tundra Universe IID device provides the PCI-VMEbus bridge. Table 3.31 summarizes the Universe IID Registers. For further information on the Universe IID registers and on programming the Universe IID, refer to the Tundra's *Universe IID™ User Manual* included on your SVME/DMV-179 Technical Documentation CD-ROM.

Table 3.31: Universe IID Registers

Offset	Register	Name
000	PCI Configuration Space ID Register	PCI_ID
004	PCI Configuration Space Control and Status Register	PCI_CSR
008	PCI Configuration Class Register	PCI_CLASS
00C	PCI Configuration Miscellaneous 0 Register	PCI_MISC0
010	PCI Configuration Base Address Register 0	PCI_BS0
014	PCI Configuration Base Address Register 1	PCI_BS1
018	PCI Unimplemented	
01C	PCI Unimplemented	
020	PCI Unimplemented	
024	PCI Unimplemented	
028	PCI Reserved	
02C	PCI Reserved	
030	PCI Unimplemented	
034	PCI Reserved	
038	PCI Reserved	
03C	PCI Configuration Miscellaneous 1 Register	PCI_MISC1
040-0FF	PCI Unimplemented	
100	PCI Target Image 0 Control Register	LSI0_CTL
104	PCI Target Image 0 Base Address Register	LSI0_BS
108	PCI Target Image 0 Bound Address Register	LSI0_BD
10C	PCI Target Image 0 Translation Offset Register	LSI0_TO
110	Reserved	
114	PCI Target Image 1 Control Register	LSI1_CTL
118	PCI Target Image 1 Base Address Register	LSI1_BS
11C	PCI Target Image 1 Bound Address Register	LSI1_BD
120	PCI Target Image 1 Translation Offset Register	LSI1_TO

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Table 3.31: Universe IID Registers (Continued)

Offset	Register	Name
124	Reserved	
128	PCI Target Image 2 Control Register	LSI2_CTL
12C	PCI Target Image 2 Base Address Register	LSI2_BS
130	PCI Target Image 2 Bound Address Register	LSI2_BD
134	PCI Target Image 2 Translation Offset Register	LSI2_TO
138	Universe IID Reserved	
13C	PCI Target Image 3 Control Register	LSI3_CTL
140	PCI Target Image 3 Base Address Register	LSI3_BS
144	PCI Target Image 3 Bound Address Register	LSI3_BD
148	PCI Target Image 3 Translation Offset Register	LSI3_TO
14C-16C	Reserved	
170	Special Cycle Control Register	SCYC_CTL
174	Special Cycle PCI bus Address Register	SCYC_ADDR
178	Special Cycle Swap/Compare Enable Register	SCYC_EN
17C	Special Cycle Compare Data Register	SCYC_CMP
180	Special Cycle Swap Data Register	SCYC_SWP
184	PCI Miscellaneous Register	LMISC
188	Special PCI Target Image Register	SLSI
18C	PCI Command Error Log Register	L_CMDERR
190	PCI Address Error Log Register	LAERR
194-19C	Reserved	
1A0	PCI Target Image 4 Control Register	LSI4_CTL
1A4	PCI Target Image 4 Base Address Register	LSI4_BS
1A8	PCI Target Image 4 Bound Address Register	LSI4_BD
1AC	PCI Target Image 4 Translation Offset Register	LSI4_TO
1B0	Reserved	
1B4	PCI Target Image 5 Control Register	LSI5_CTL
1B8	PCI Target Image 5 Base Address Register	LSI5_BS
1BC	PCI Target Image 5 Bound Address Register	LSI5_BD
1C0	PCI Target Image 5 Translation Offset Register	LSI5_TO
1C4	Reserved	
1C8	PCI Target Image 6 Control Register	LSI6_CTL

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Table 3.31: Universe IID Registers (Continued)

Offset	Register	Name
1CC	PCI Target Image 6 Base Address Register	LSI6_BS
1D0	PCI Target Image 6 Bound Address Register	LSI6_BD
1D4	PCI Target Image 6 Translation Offset Register	LSI6_TO
1D8	Reserved	
1DC	PCI Target Image 7 Control Register	LSI7_CTL
1E0	PCI Target Image 7 Base Address Register	LSI7_BS
1E4	PCI Target Image 7 Bound Address Register	LSI7_BD
1E8	PCI Target Image 7 Translation Offset Register	LSI7_TO
1EC-1FC	Reserved	
200	DMA Transfer Control Register	DCTL
204	DMA Transfer Byte Count Register	DTBC
208	DMA PCI bus Address Register	DLA
20C	Reserved	
210	DMA VMEbus Address Register	DVA
214	Reserved	
218	DMA Command Packet Pointer Register	DCPP
21C	Reserved	
220	DMA General Control and Status Register	DGCS
224	DMA Linked List Update Enable Register	D_LLUE
228-2FC	Reserved	
300	PCI Interrupt Enable Register	LINT_EN
304	PCI Interrupt Status Register	LINT_STAT
308	PCI Interrupt Map 0 Register	LINT_MAP0
30C	PCI Interrupt Map 1 Register	LINT_MAP1
310	VMEbus Interrupt Enable Register	VINT_EN
314	VMEbus Interrupt Status Register	VINT_STAT
318	VMEbus Interrupt Map 0 Register	VINT_MAP0
31C	VMEbus Interrupt Map 1 Register	VINT_MAP1
320	Interrupt Status/ID Out Register	STATID
324	VIRQ1 STATUS/ID Register	V1_STATID
328	VIRQ2 STATUS/ID Register	V2_STATID
32C	VIRQ3 STATUS/ID Register	V3_STATID

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Table 3.31: Universe IID Registers (Continued)

Offset	Register	Name
330	VIRQ4 STATUS/ID Register	V4_STATID
334	VIRQ5 STATUS/ID Register	V5_STATID
338	VIRQ6 STATUS/ID Register	V6_STATID
33C	VIRQ7 STATUS/ID Register	V7_STATID
340	PCI Interrupt Map 2 Register	LINT_MAP2
344	VME Interrupt Map 1 Register	VINT_MAP2
348	Mailbox 0 Register	MBOX0
34C	Mailbox 1 Register	MBOX1
350	Mailbox 2 Register	MBOX2
354	Mailbox 3 Register	MBOX3
358	Semaphore 0 Register	SEMA0
35C	Semaphore 1 Register	SEMA1
360-3FC	Reserved	
400	Master Control Register	MAST_CTL
404	Miscellaneous Control Register	MISC_CTL
408	Miscellaneous Status Register	MISC_STAT
40C	User AM Codes Register Register	USER_AM
410-EFC	Reserved	
F00	VMEbus Slave Image 0 Control Register	VSI0_CTL
F04	VMEbus Slave Image 0 Base Address Register	VSI0_BS
F08	VMEbus Slave Image 0 Bound Address Register	VSI0_BD
F0C	VMEbus Slave Image 0 Translation Offset Register	VSI0_TO
F10	Reserved	
F14	VMEbus Slave Image 1 Control Register	VSI1_CTL
F18	VMEbus Slave Image 1 Base Address Register	VSI1_BS
F1C	VMEbus Slave Image 1 Bound Address Register	VSI1_BD
F20	VMEbus Slave Image 1 Translation Offset Register	VSI1_TO
F24	Reserved	
F28	VMEbus Slave Image 2 Control Register	VSI2_CTL
F2C	VMEbus Slave Image 2 Base Address Register	VSI2_BS
F30	VMEbus Slave Image 2 Bound Address Register	VSI2_BD
F34	VMEbus Slave Image 2 Translation Offset Register	VSI2_TO

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Table 3.31: Universe IID Registers (Continued)

Offset	Register	Name
F38	Reserved	
F3C	VMEbus Slave Image 3 Control Register	VSI3_CTL
F40	VMEbus Slave Image 3 Base Address Register	VSI3_BS
F44	VMEbus Slave Image 3 Bound Address Register	VSI3_BD
F48	VMEbus Slave Image 3 Translation Offset Register	VSI3_TO
F4C-F60	Reserved	
F64	Location Monitor Control Register	LM_CTL
F68	Location Monitor Base Address Register	LM_BS
F6C	Reserved	
F70	VMEbus Register Access Image Control Register	VRAI_CTL
F74	VMEbus Register Access Image Base Address	VRAI_BS
F78	Reserved	
F7C	Reserved	
F80	VMEbus CSR Control Register	VCSR_CTL
F84	VMEbus CSR Translation Offset	VCSR_TO
F88	VMEbus AM Code Error Log	V_AMERR
F8C	VMEbus Address Error Log	VAERR
F90	VMEbus Slave Image 4 Control Register	VSI4_CTL
F94	VMEbus Slave Image 4 Base Address Register	VSI4-BS
F98	VMEbus Slave Image 4 Bound Address Register	VSI4-BD
F9C	VMEbus Slave Image 4 Translation Offset Register	VSI4-TO
FA0	Reserved	
FA4	VMEbus Slave Image 5 Control Register	VSI5_CTL
FA8	VMEbus Slave Image 5 Base Address Register	VSI5-BS
FAC	VMEbus Slave Image 5 Bound Address Register	VSI5-BD
FB0	VMEbus Slave Image 5 Translation Offset Register	VSI5-TO
FB4	Reserved	
FB8	VMEbus Slave Image 6 Control Register	VSI6_CTL
FBC	VMEbus Slave Image 6 Base Address Register	VSI6-BS
FC0	VMEbus Slave Image 6 Bound Address Register	VSI6-BD
FC4	VMEbus Slave Image 6 Translation Offset Register	VSI6-TO
FC8	Reserved	

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Table 3.31: Universe IID Registers (Continued)

Offset	Register	Name
FCC	VMEbus Slave Image 7 Control Register	VSI7_CTL
FD0	VMEbus Slave Image 7 Base Address Register	VSI7-BS
FD4	VMEbus Slave Image 7 Bound Address Register	VSI7-BD
FD8	VMEbus Slave Image 7 Translation Offset Register	VSI7-TO
FDC-FEC	Universe IID Reserved	
FF0	VME CR/CSR Reserved	
FF4	VMEbus CSR Bit Clear Register	VCSR_CLR
FF8	VMEbus CSR Bit Set Register	VCSR_SET
FFC	VMEbus CSR Base Address Register	VCSR_BS

Caution

Register space marked as "reserved" should not be overwritten. Unimplemented registers return a value of 0 on reads; writes complete normally.

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Appendix A

Manufacturer's Documents and Related Information

In this appendix...

This appendix contains information on the following topics:

- ❏ manufacturer's documents for components used on SVME/DMV-179; and
- ❏ standards/specifications for components used on SVME/DMV-179.

For additional information on any of the devices or interface standards used on the SVME/DMV-179, please refer to the appropriate reference provided in this appendix. Many of the documents are also available on the particular company's world wide web (www) site.

Note

To make locating these www sites easier for you, the *SVME/DMV-179 Technical Documentation CD-ROM* includes a bookmark file named weblinks.htm.

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Table A.1: Manufacturer's Documents

Device	Company	Description
PowerPC 7400	Motorola (www.motorola.com)	PowerPC Microprocessor with Altivec technology
PowerPC 750	Motorola (www.motorola.com)	PowerPC Microprocessor
GS88036b (L2 Cache)	GSI Technology (www.GSITechnology.com/burstrams.htm)	Synchronous burst SRAMs, SCD Pipeline Flow Through 4 M or 8M
GT-64130 System Control-ler for PPC	Galileo Technology (www.GalileoT.com)	System Controller for PPC
SYM53C885 (PCI/SCSI/Ether-net)	Symbios Logic Inc. (lsilogic.com/techlib/index.html)	PCI-SCSI/Fast Ethernet Multi-function Controller
CA91C142 (Universe II)	Tundra Semiconductor Corporation (www.tundra.com/index_prod.cfm?treeid=100361)	PCI to VMEbus Bridge
STK14C88 (NOVRAM)	Simtek Inc. (www.simtek.com/simtek/docs/datasheets/ STK14C88.htm)	32K x 8 AutoStore (TM) Nonvolatile Static RAM
QL3060 (FPGA)	QuickLogic (www.QuickLogic.com/products/pasic3)	60,000 Usable Gate pASIC 3 FPGA
AM29DL323 AM29DL163 AT49BV16X4 (Flash)	AMD (www.amd.com/products/nvd/techdocs /techdocs.html#3volt) ATMEL http://www.atmel.com/atmel/products/prod108.htm	2M x 16 Flash
KM48S8030 (DRAM)	Samsung Corporation (www.usa.samsungsemi.com/products/summary/ sdramcomp/KM48S8030C.htm)	8M x 8 SDRAM
DS1685 (RTC)	Dallas Semiconductor (www.dalsemi.com/DocControl/PDFs/ 1685-87.pdf)	RTC IC with 256x8 NVSRAM, alarm wake-up
Z85230 (SCC)	Zilog Inc. (www.zilog.com/products/scc.html)	Serial Communications Controller
ST16C2550 (UART)	Exar (www.exar.com/products/st16c2550.html)	Dual UART with 16-byte transmit and receive FIFOs
AT93C66 AT34C02 NM93C46 (serial EEPROM)	Atmel Corporation (www.atmel.com/atmel/products/prod162.htm) Fairchild Semiconductor (www.fairchildsemi.com/pf/NM/NM93C46.html)	Serial EEPROM

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Table A.2: Standards/Specifications

Interface Standard	Document Title	Document Reference
VMEbus	VME64 Specification	ANSI/VITA I - 1994
SCSI	ANSI Small Computer System Interface - 2 (SCSI-2 Draft Document)	X3.131.1990
Ethernet	IEEE Standard for Local Area Networks	IEEE 802.3
PCI	Peripheral Component Interconnect (PCI) Local Bus Specification	Revision 2.1
PMC	VITA 20-199x Draft 1.11 November 1999, Conduction Cooled PCI Mezzanine Card (CCPMC) Draft Standard	VITA 20-199x Draft 1.11
CMC	IEEE - Common Mezzanine Card Specification (CMC)	P1386.1 Draft 2.0
EIA-232 Serial	Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange (EIA-232-D)	ANSI/EIA-232-D
EIA-422 Serial	Electrical Characteristics of Balanced Voltage Digital Interface Circuits	ANSI/TIA/EIA-422-B-1996

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